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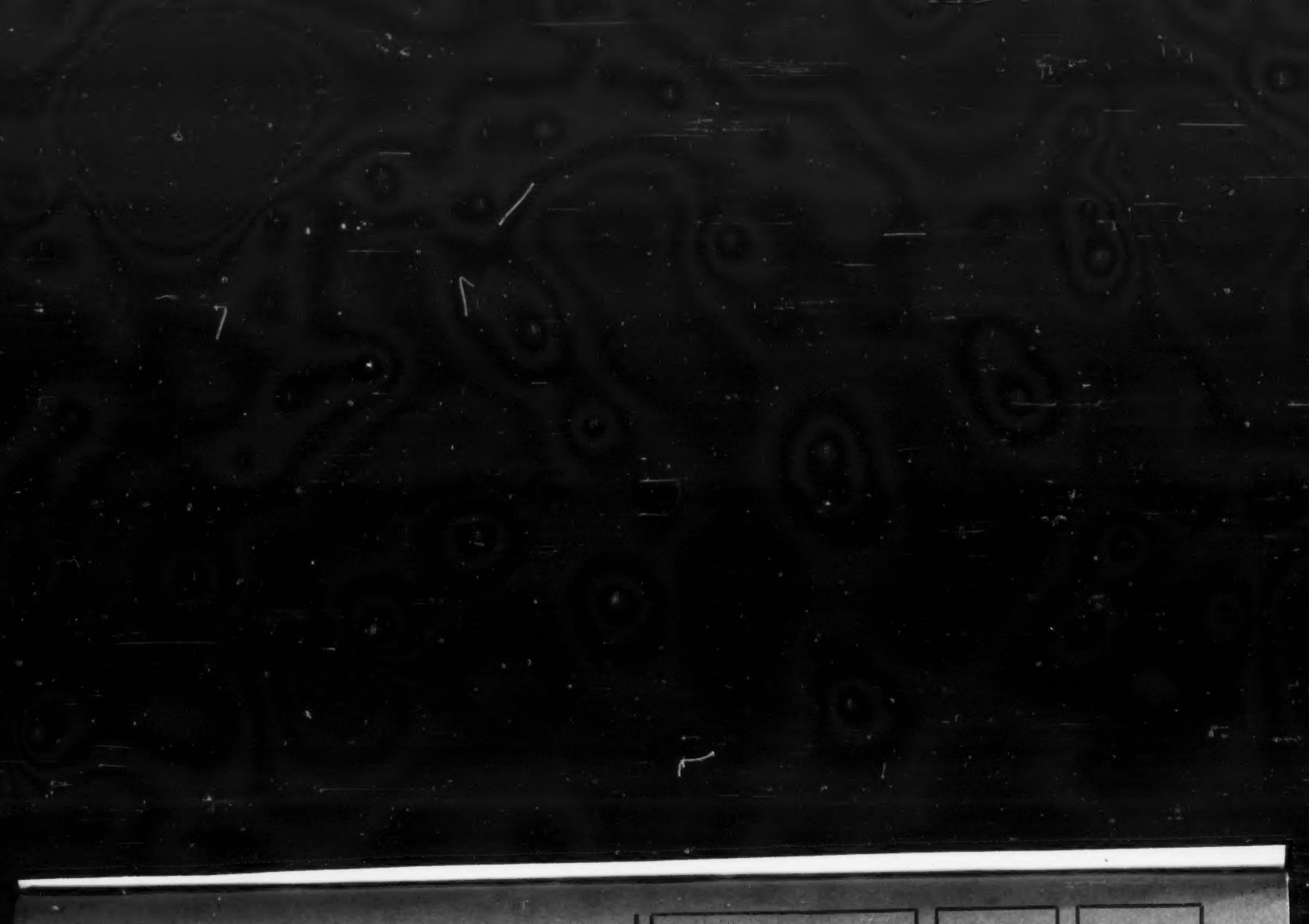

THE JOURNAL OF NEUROLOGY AND PSYCHOPATHOLOGY

Vol. XVI. JANUARY, 1936 No. 63

Original Papers

MESCALIN AND DEPERSONALIZATION*

THERAPEUTIC EXPERIMENTS

By

E. GUTTMANN AND W. S. MACLAY, LONDON

DEPERSONALIZATION is a syndrome which occurs in various states and psychic disturbances. In spite of several interesting studies its psychopathology still deserves to be analysed and defined, as different experiences seem to have been conceived under the same topic. From a purely descriptive point of view, the syndrome has been classified as a disturbance of 'Ichbewusstsein.' Henderson and Gillespie call it 'a subjective condition in which the patient feels that he is no longer himself.' But patients also complain about changes in their surroundings (the 'derealization' of Mapother). Therefore this definition is apparently too narrow.

Mayer-Gross has recently written a paper in which he gives a survey of clinical findings and psychopathology of depersonalization. He accepts Mapother's distinction of depersonalization and derealization depending on whether the feelings of unreality are related to the patient's own personality or to the outer world. He also analyses the particular significance of the person's own body in relation to the self and the world, or as a part of both of them.

For these investigations, patients were used whose complaints fit in with Lange's description of the symptoms. 'The feeling of belonging to one's own body is lost. The patient feels like an automatic machine, like a statue. The sound of his voice, his face in a mirror seem strange to him. His mental pictures are shadowy. His perceptions do not awaken a feeling of reality. His actions are mechanical, without the feeling of will. Thoughts come and go without personal effort. The patient feels like an apathetic spectator without connexion with his own perceiving and doing.'

* This research was made possible by the support of the Rockefeller Foundation. From the Maudsley Hospital, London.

As mentioned, these symptoms are to be found singly or collectively in various states. They can be observed even in normal persons, for example, in states of exceptional fatigue.

It seemed of special interest that the symptoms of depersonalization could be produced experimentally by mescalin intoxication. The psychic effects of this drug have been studied by different authors. Beringer published a large number of protocols and self-descriptions and tried to give a systematic clinical description of the mescalin psychosis. The most striking symptoms which have attracted the main interest of different authors are the hallucinations, especially the visual ones. Sensory perception and its disturbances have also been the object of valuable psychological investigation (Stein and Mayer-Gross). Before Beringer, less attention was paid to the change of consciousness in the widest sense of the word. This author described as quite characteristic, in addition to abnormality of sensory functions, the alteration of consciousness and abnormal state of mood as the main symptoms.

The question whether there is one specific *alteration of consciousness* or several, will not be discussed here. Beringer, who apparently is inclined to take the alteration as a uniform one, distinguishes two ways of being aware of it, one the opposite of the other : on the one hand, there is an awareness of an abnormal distance between the self and what happens in its consciousness, on the other hand, the experience of an abnormal fusion of subject and object. The symptoms of the former group are very reminiscent of the complaints of patients in states of depersonalization.

The following are some examples of such observations, the first two being quoted from a paper by Buchanan, the others from the authors' own experiments with normal people.

1. ' At this stage of intoxication (beginning) I had a certain sense of the things about me as having a more positive existence than usual ' (Weir Mitchell).

2. ' My state at this period can but be described as a supernormally clear focus of attention with practically no background of consciousness ' (Fernberger).

3. ' I drew my hand across my face and it felt as if the hand had no connexion with me and did not belong to me. I looked at it as if it was not my own, then the feeling faded and not even by using my imagination could I recapture it.'

4. ' Gradually, the surroundings began to show a particular change. Objects stood out more distinctly. The faces of the people around appeared to be more sharply outlined and more deeply furrowed than before without appearing actually disfigured. My own face appeared strange to me, although I recognized that its proportions were unaltered.'

5. ' The whole surroundings appeared to me as if I were returning after a long absence into a room which had previously been very familiar to me, but where now all the objects were as if they had become quite strange and

were saying : " Go away again, you will not find your previous relationship to us. You are quite strange and altered." '

6. ' Her own body seems to her difficult to separate from its surroundings : there appears to be an uninterrupted continuity. Also the integration of her personality is gradually lost. At first the loss of distance is very unpleasant. The solid form melts away. It is no longer possible to feel oneself a separate personality. Also the objects in the surroundings lose their solid shape. They melt away, only to form themselves again from the distance.'

The *changes of mood* in mescalin intoxication may be important in judging the results. Beringer says euphoria is very characteristic in mescalin intoxication. In his observations it usually started near the beginning of the intoxication after about an hour. After small doses, he writes, ' It appears as cheerfulness and elation, usually with the inclination to make little jokes and malicious remarks. They get into a state of mental exhilaration ; they become talkative and disinhibited ; they commit social errors and enjoy committing them. Very often they are ironical and feel superior to others. They see everything from a comical angle.' This euphoria can increase up to a very ecstasy, but in the early stages and in its manifestations after small doses it reaches only a limited degree. Sometimes the mood is altered by anxiety attacks, occasionally, according to Beringer's description, by depressive states. Only two of Beringer's subjects reported depression, either in the period of recovery or even after the end of intoxication. Finally, Beringer mentions the retrospective attitude of the patients towards their experiences of intoxication, a point which the present authors specially stress, because Beringer's observations can be confirmed by their own previous experiences with normal persons and also because they are of the opinion that it may be possible to use this effect of the drug indirectly for psychotherapeutic purposes. The experience of the intoxication, as Beringer also observed, makes a particularly deep impression ; neither the details nor the new and fantastic sensory perceptions are the decisive factors, but there is something strange and mysterious which remains. The personality is touched to its core and is led into provinces of psychic life otherwise unexplored ; light is shed on boundaries otherwise dark and unrevealed and in this some aid may be given to *Existenzerhellung* (illumination of existence). These experiences suggested the idea of making psychotherapeutic use of the intoxication, or, to be more exact, of the state after it.

PERSONAL EXPERIMENTS

Depersonalization states seemed particularly suitable for experiments with mescalin, because there is apparently a special relationship between the symptoms of the morbid state and those of the intoxication. The extraordinary similarity of the symptoms on the one hand and their antag-

onism on the other aroused our interest, both theoretically and practically. It was hoped that some information about the character and the pathogenesis of the syndrome, or of the disease causing it, would be gained by observing the relationship of the experimentally produced symptoms to the original ones, particularly if the effect happened to be parallel. On the other hand, if the effect of the drug was an antagonistic one, some therapeutic results might be expected.

For various reasons, the large doses generally used for experimental purposes were not given. In the first place, it was desirable to avoid the disagreeable vegetative symptoms, as sick people were being used. For the same reason the drug was not given by injection (as was done in former investigations in accordance with the custom of other authors), but by mouth, thus avoiding the troublesome pain at the site of injection. In addition it was necessary to avoid producing alarming psychotic symptoms in order not to upset the patients themselves and to avoid gossip among other psychopathic patients in the ward. Finally, it seemed that only the beginning and the end of the experimental states formerly observed showed the phenomena which were of special interest, and it was considered possible to produce just these symptoms, and perhaps only these, by using small quantities of the drug. A synthetic preparation was used, prepared according to the method published by Slotta and Szyszka, the substance being kindly given by Dr. Slotta himself. 0·1 to 0·2 gm. of the drug dissolved in a small amount of water was given between breakfast and lunch. Generally small doses of quinine or some other ineffective substance were given as a control on the day previous to the experiment, quinine being chosen because its bitter taste resembles that of mescalin. The relatively small doses given by mouth did not produce nausea or vomiting and the only vegetative symptoms observed were mydriasis, flushes and sometimes acceleration of the pulse.

The eleven observations briefly reported in Table I were made between June, 1934, and February, 1935.

In trying to draw conclusions from these experiments, the impossibility of comparing the different results in different patients in the same way as is done in experiments with animals must be remembered. The doses can never be said to be relatively equal, nor can they be estimated per unit of body weight, especially when using a drug of so high an efficiency. The individual variation of resistance against mescalin is marked, as is known from previous experience. Taking all this into consideration, it must suffice to say that the intoxication produced by the above-mentioned doses remained within certain limits, viz. in the stage before alarming hallucinations started. Only two of the group had visual hallucinations (Cases 6 and 8). One of these and two others had a slight alteration in the field of the perception of their own body. Three other patients (Cases 2, 10 and 11) had vivid visual sensations when their eyes were pressed (Liepmann's sign). Another measure

TABLE I. OBSERVATIONS ON MESCALIN

Case No.	Dosage of mescalin	Main symptom: Change of	Hallucinations. L = Liepmann's sign	Effect of mescalin on		Type of case
				Mood	Depersonalization	
1	gm. 0·1	Self	0	Euphoria, anxiety	Intensified	Psychasthenic depression
2	0·1 0·2	Self	L	1. Depression 2. Euphoria and confusion	Intensified	Recurrent endogenous depression
3	0·1	Images, objects	0	Slight euphoria	Improved	Endogenous depression
4	0·1 0·2	Things and self	0	More cheerful	Things clearer	Endogenous depression
5	0·1 0·2	Self	0	Bewildered	Distracted from symptoms	Schizophrenia or atypical depression
6	0·1 0·2	Self	Yes	Bewildered*	Unchanged or intensified	Obsessional state
7	0·1	Self and surroundings	0	Depressed and laughing	Worse	Schizoid reaction: depressive illness
8	0·1 0·1½	Self*	Yes	More anxious	Intensified	Schizophrenia
9	0·1	Self*	0	Depressed and anxious	Intensified	Obsessional depression
10	0·1 0·2	Pictures, self	L	Contented, later depressed	Pictures improved	Endogenous depression
11	0·2	Images, self	L	Depressed, later slightly euphoric	Pictures improved, otherwise worse	Endogenous depression

* Described some kind of external change due to change in themselves.

of the degree of intoxication was the fact that the state never lasted more than five hours, which was the minimum time of intoxication in Beringer's experiments. The absence of vegetative symptoms has already been mentioned.

TYPES OF REACTION

In examining the effect of the drug upon depersonalization symptoms, two distinct groups can be isolated: on the one hand, those who said that their symptoms disappeared or were less intensive for some time; on the other, those who stated that their symptoms were intensified.

GROUP 1

1. 'I felt better during the two hours. My mental pictures were clearer after I had had the medicine' (Case 10).

2. 'Can now picture as she used to do before. On the following night had first dream since onset of illness. On the following day pictures still vivid but not as clear as yesterday, when she could imagine as formerly (Case 3).

3. 'Things were clearer' (Case 4).

4. 'Could picture better than she can to-day' (Case 11).

GROUP 2

1. 'Now all is unreal' (Case 2).

2. 'I felt further away than I feel now—worse' (Case 8).

3. 'My head seemed to go more dead. It made the dream feeling worse' (Case 9).

In Cases 6 and 5 depersonalization symptoms were certainly not improved, but it was uncertain whether they were intensified or not. Another patient (Case 1) stated: 'I felt as if everything would look brighter. . . . I have learned that I can feel brighter.' In this case the improvement described was probably only due to the euphoria, not to a real change in the depersonalization symptoms.

In looking through the symptomatology in the cases of Group 1, a striking fact comes to light. In this group are all those who complained predominantly about a change in the perception or imagination of the objects around them in the world outside, much less about changes in themselves, changes in their personality. There are no cases of this type among the other patients. Therefore the simple deduction can be made that *mescalin may remove depersonalization symptoms in so far as they are related to the outer world* ('*derealization*'). It does not remove, and may even intensify, the feeling of change in the self.

In investigating the clinical diagnosis of the cases in Group 1, it was found that three were depressive states of mainly endogenous character and periodic course. There are doubts whether one or other of the cases might finally turn schizophrenic. One was a cycloid psychosis. In Group 2 also there was no concordance from the clinical diagnostic standpoint. The opinion has just been mentioned that in Case 1 the change of symptomatology was probably caused by a change of mood due to the toxic euphoria. Therefore, results in the other cases must be considered from the same point of view. Two of the cases in Group 1 showed depression during the experiment and noticed improvement of their special symptoms in spite of that (Cases 10 and 11). In the third case (no. 3) the improvement of sensory perception lasted considerably longer than the euphoria, and in the last case (no. 4) the patient, even after the experiment, distinguished between mood and perception. Furthermore, this euphoria was so slight that it was only noticed by the patient himself, not by the observers. It therefore seems reasonable to separate the change in the depersonalization symptoms from the emotional reaction.

EUPHORIA

According to Beringer's description, as above-mentioned, the prevalent mood in mescalin intoxication is euphoria. Depressive states are rare and the euphoria is seldom pure ; often it is in striking contrast to the bodily uneasiness. Often it is mixed with, or interrupted by, anxiety, excitement or bewilderment. Euphoric states were not found so regularly as might have been expected, but in the majority of cases the descriptions of intoxication were not unusual for mescalin. There was an alternation between euphoria and anxiety, laughing and crying, bewilderment and amusement, and only in four cases were there clear distinct emotional states.

1. More cheerful (Case 4).
2. Slightly euphoric (Case 3).
3. Pleasant feeling, afterwards depressed (Case 10).
4. Depressed, later slightly elated (Case 11).

A fifth case can be added (no. 2), which during the first experiment with very small doses showed an intensification of depression, while with slightly larger doses, the patient showed a state which she described as ' sometimes happy ; later on, muddled.'

In regard to mescalin euphoria, caution is necessary before drawing any conclusions from these observations, but it is striking that the pure emotional reactions were found in just those cases which were clinically diagnosed as endogenous depression with the previously mentioned proviso. The results call to mind an interesting paper by Kant, who examined the effect of hashish on manic-depressive and schizophrenic patients after the end of their acute psychosis. He observed that the manic-depressive patients reacted in the form of their previous psychosis, i.e. the depressive ones become depressed, in marked contrast to the otherwise euphorizing effect of the drug. The schizophrenic patients, even the depressed ones, developed euphoria and anxiety.

Exactly parallel observations were made by Zador, who used nitrous oxide, which also produced depression in depressive states, euphoria and anxiety in schizophrenic states. In the same way it can be taken as probable that in our cases the drug produced constitutionally preformed reactions. The manic and melancholic reactions can be considered as akin, and the opinion is held that psychopathological analysis justified the conception that the clear cyclothymic euphoria can be distinguished from hebephrenic and other euphoric states. Beringer thought of such connexions between the constitution and reaction-types and mentions that cyclothymics might be expected to show more homonymous (emotional), schizoids more heteronymous pictures, and that these reaction-types might be indications of the personality, but he could not prove such relationships.

Bensheim is the only investigator who claims, with some caution, to have found different features in the course and content of mescalin intoxication dependent on the cyclothymic or schizothymic character of the per-

sonality. In regard to the question discussed here, he mentions the emotions between euphoria and depression as significant for the cyclothymic group, ecstasy as significant for the schizothymic group. Furthermore, he points to the fact that the sensory phenomena in the first group are nearer to reality than in the latter.

If it is asked why he and Beringer did not find striking correlations between personality and the picture of the intoxication it must be remembered that their observations are mostly based on experiments with large doses, producing severe intoxication ; and it can be taken for granted that with the majority of drugs higher degrees of intoxication produce stereotyped pictures of the so-called exogenous reaction-type.

DRUG EFFECTS AND REACTION-TYPES

The discussion about the origin of this uniformity is not yet at an end ; even the question whether these symptomatic psychoses are really so uniform is not yet settled. All authors concerned with the subject see exceptions to the respective rules. Curran, for instance, who made a wide study of confusional states, emphasizes that mescalin and hashish do not fit into the general scheme and that these intoxications have peculiarities which distinguish them from other symptomatic psychoses. The whole question of exogenous reaction-types will not be discussed here, but it is worth mentioning that our observations point to the likelihood that small doses slowly administered are more likely to produce individual and homonymous reactions, whereas big doses are more apt to lead to heteronymous reactions with a varying degree of clouding of consciousness, even to the extent of coma. For details of the different theories about symptomatic psychoses reference can be made to Ewald's chapter on this subject in Bumke's *Handbuch der Psychiatrie*. Case 2 shows different reactions depending upon the amount of the drug very well. We have previously observed the same difference, comparing the transition stages at the beginning and end of intoxication with its acme. Many more investigations are needed with more exact analysis of all the circumstances which may influence the picture.

Knowledge of the connexion between a drug and its psychic effect is still very limited, particularly so far as the individual reaction of the personality is concerned. Different drugs are known to have different effects and different persons are known to react differently to the same drug, but it is still almost impossible to prophesy with scientific exactitude or even with probability how a given person will react to a given quantity of a given drug. There is not even any exact knowledge about alcohol, although so many have experienced its effects. Meggendorfer in Bumke's *Handbuch* makes general statements only. ' Depending on his constitution, an intoxicated person may be frank, confiding, good-natured, gentle or angry, excitable or inclined to violence. . . . The symptoms of intoxication are, to a large extent, dependent on personal qualities, mood and behaviour being especially apt to show

features differing from typical drunkenness. Morose excitement instead of elation is one well-known variation. . . . There are also variations in the course of intoxication, as for example those people who, in the early stage, have only a very short period of excitement so that they quickly get tired and sleepy after small quantities of alcohol and may even fall asleep.' In all this there is no hint of the type of personality which may react in one way or another.

If only ' acute drug psychoses ' occurring after only one dose of the drug are considered, it can be briefly stated that the picture of the psychosis probably depends on :—

1. The drug : type, amount, speed of supply and absorption.
2. Personality :—
   (*a*) Bodily constitution, individual resistance.
   (*b*) Bodily disposition : state of infection, fatigue, previous intoxications, acquired resistance, actual state of metabolism (e.g. hashish effect is intensified by sugar).
   (*c*) Psychic constitution.
   (*d*) Psychic disposition (mood).

Lindemann and Malamud in their interesting experiments compared the effects of different drugs in the same person. They found that each drug undoubtedly has certain specific characteristics, but these are quite closely related to the conditions which are present at the time when these specific effects are produced. The changes produced by a given drug will not only be elaborated in the light of the pre-existing psychic state, but totally new types of reaction may result from such an interrelationship.

CONCLUSIONS

In these experiments the dispositional factors have been eliminated only by standardizing the experiments in the atmosphere of the hospital. Future investigators will have to analyse the complicated network of direct drug effects and bodily and psychic reactions of the personality in every single case. Only an exact knowledge of these factors will make possible real therapeutic use of such a difficult method of treatment as drug intoxication. In the present series an effect which could be regarded as a therapeutic one in that it lasted longer than the actual intoxication was only seen on three occasions. A priori the opinion was formed that it was only the psychic response to the experimental psychic state which could produce some effect. The three patients made very similar statements regarding the value of the experience ; e.g. ' I have seen that I can be as I used to be before.' In two of the cases the progressive recovery appeared to depend on the nature of the process (endogenous depression) and neither more nor less significance is attributed to the effect of the experiment on the course of the disease than to any other pleasant or encouraging experience, but it is known that during the period of recovery from endogenous psychoses psychic factors are not

without influence, and so this test for the capacity to recover may be a useful adjuvant for psychotherapeutic activity in patients, who show the syndrome of depersonalization and are amenable to psychotherapy. While these investigations were being made, a striking therapeutic result in a similar type of case was reported. Claude and Ey have observed 'Une malade internée pour depression mélancolique avec sensation de depersonalisation qui a récuperé sa personalité, les impressions corporelles normales au cours de la mezcalinisation. Elle est sortie guérie quelque jours après.' These authors used 0·25 to 0·5 gm. of the drug. It is unfortunate that no data about the special case were given and no details about the mechanism of the recovery.

If it was a case of real endogenous depression, it must be considered whether the bodily shock of a severe intoxication could produce such a result or whether the psychic effect was the more important factor. Owing to using the previously mentioned small doses and the slow action due to taking the drug by mouth, such impressive psychic reactions were not seen, though well known both from personal experience and from many self-descriptions (see also the quotation from Beringer's book). The state of bewilderment and upheaval occurring after severe intoxication may be suitable for intensive psychic influence, as Bensheim pointed out, but it requires an atmosphere of personal contact and discretion which it is difficult to achieve in a hospital ward.

What can be learned from the therapeutic failures, especially those who showed no improvement, but stated clearly that the feeling of depersonalization had been intensified? Zucker proposed and used intoxication as a method for more exact description and analysis of psychic symptoms. He did this by asking patients whether and in how far they could distinguish the psychotic symptoms from the artificially produced new ones, e.g. hallucinations. He found, for example, that schizophrenics always differentiated mescalin hallucinations from their endogenous sensations, whereas delirious patients generally did not. Conversely it can be said that the group of patients considered in this paper was unable to distinguish the mescalin depersonalization from the original depersonalization (sensory perceptions are not considered here), and the conclusion can be drawn that the psychopathological experience of both may be similar if not identical, that they are commensurable and of the same denomination. This may or may not point to a deeper relationship between the two states. In any case it suggests a method for carrying on this comparative research work. After seeing some mescalin psychoses, every investigator is at first struck by their similarity to schizophrenic states, but with more experience is disappointed when he notices the great difference. Experiences, such as described, teach us that the whole psychosis must not, or at least not primarily, be used for comparison, but only single traits.

We should like to thank Dr. E. Mapother for his permission to use the clinical material.

SUMMARY

1. Mescalin is able to improve depersonalization symptoms in so far as they consist of changes of the surroundings (derealization), not of the self.

2. Mescalin depersonalization is identical with this symptom in morbid states, and therefore can be used as a model for therapeutic experiments.

3. Patients of the manic-depressive group answer to an intoxication with smali doses by reactions of their own endogenous types.

4. The patients' experience of the improvement of their symptoms, even if only of short duration, may be used as an adjuvant for psychotherapeutic activity.

CASE RECORDS

Case No. 1. Woman, æt. 23 years

Complaint.—Attacks of panic and complaint of feeling changed.

Family History.—One paternal aunt committed suicide. Father was irritable and quick-tempered. Mother was neurotic.

Personal History.—Early development was normal except for bed-wetting till six years old. She was at a special school on account of heart trouble and did quite well but never tried very hard. Her work record was satisfactory ; she married at the age of 21.

She has always been considered delicate and in consequence family were inclined to spoil her. She liked having a good time and was fond of sport, dancing and cinemas. She was inclined to be romantic.

Since her marriage in 1933, she has felt lonely and disappointed at the dullness of married life. Six months before admission while sitting reading she suddenly developed symptoms of an acute anxiety attack ; she screamed with fear and rushed out of the house. Since then she has been unable to live alone or even to go from one room to another without panic.

On admission she was a thin reserved girl who looked frightened and apprehensive. She said she was afraid of going mad, thought that she was not the same person and that her voice was not her own. She wept easily and had frequent anxiety attacks, which were especially well-marked when she was visited by her husband or relatives.

Mescalin intoxication.—Dose 0·1 gm.

Two hours after the mescalin she looked frightened and restless. On two occasions she jumped from her chair and clutched the doctor's arm, being only persuaded to sit down again with difficulty. From time to time she smiled but would give no reason for doing so and would give no account of her feelings.

Next day she said : ' I felt like two different people. I felt happy and yet I felt hopeless at the same time. When I was laughing it seemed as if I had my sister's personality and her face. Once I thought I was mother, then I felt very happy. The feelings seemed to come in waves. After you had gone I couldn't stop laughing, I don't know why, it didn't seem to be me laughing. The laugh sounded like my sister's laugh. I felt as if everything around looked brighter, I wondered why everyone around looked bright and happy. It was a strange feeling that came over me, I suddenly felt as if I was different in some way.'

Case No. 2. Woman, æt. 36 years

Complaint.—Depression and a feeling of being partly dead.

Family History.—One brother is in a mental hospital suffering from recurrent depression.

Personal History.—Her early development was normal. She had a good education and a good record as a clerk in a good position. She has always been easy-going, popular, and is fond of amusement and social life.

She has had two previous depressive illnesses, one in 1926 when disappointed in a love affair, the other in 1930 when her brother went into a mental hospital.

Two months before admission she again began to feel depressed. She lost her appetite, could not sleep, could not concentrate, wept easily, was self-reproachful and had suicidal thoughts. In the period of recovery depersonalization symptoms appeared. She felt different, felt that her hands looked changed, and that she was partly dead.

On examination she showed psychic and motor retardation. She looked depressed and felt that 'she could never make another start.' For a time she was almost stuporose. Mescalin was given during the period of recovery.

Mescalin intoxication :

1. Dose 0·1 gm. She showed slight intensification of her symptoms of depersonalization, and of her depression. No hallucinations.

2. Dose 0·2 gm. After an hour she showed marked vasomotor reactions and began to ask for her discharge from hospital in a stereotyped childish manner. Then she seemed to become muddled, crying at one moment and smiling the next. She said, 'I feel so happy, I want to go home, happy but always unreal.' After six hours the euphoria had gone ; she looked frightened, but denied it. During the intoxication there were no spontaneous hallucinations, but she perceived colours and patterns when she closed her eyes and pressed her eyeballs. She continued to ask for her discharge all through the following day, explaining that she felt restless and did not like to be left alone.

Case No. 3. Woman, æt. 39 years

Complaint.—Worried and depressed and complains of inability to picture things in her mind as she used to do.

Family History.—One sister had a nervous breakdown and committed suicide.

Personal History.—She was considered rather nervous as a child but there were no specific neurotic traits. She did well at school and was in domestic service until her marriage at 26. She has two children.

She has always been cheerful and energetic, an excellent wife and mother but overconscientious, and has a very high standard both for herself and her children.

Five months before admission she had an acute anxiety attack during the illness of one of her children. This was followed by similar attacks. She then became worried and irritable ; she lost weight and feared that she was going mad. Every now and then a state developed in which everything seemed abnormally still and her own bodily functions seemed quite stationary. On examination she was tense and anxious, complaining of feelings of unreality, loss of affection for her family, and inability to concentrate. Her most bitter complaint was that she could not picture people and things in her mind's eye as she usually could. There was some disturbance of the sense of time.

Mescalin intoxication.—Dose 0·1 gm.

She became a little drowsy, then slightly elated and what she described as 'jerky in her mind.' She said that she could picture things as she used to do, for example, her late husband, St. George's cathedral, etc.

On the following night she had her first dream since the onset of her illness. Next day she was still able to picture things much better but not so well, in her opinion, as during the intoxication when she said that she could imagine things just as before her illness.

Case No. 4. Man, æt. 23 years

Complaint.—Depression, sleeplessness, inability to concentrate and a feeling that everything about him had changed.

Personal History.—His early development was normal; he reached the top standard at school and then worked for eight years satisfactorily in the same position.

Ever since leaving school he has complained at various times of feelings of inferiority and depression.

For three months before admission he was depressed, slept badly, and thought that people were looking at him. He complained that things around seemed changed, that he could not enjoy the visits of his friends and relatives, and said: 'My head feels empty; I feel that everything I do is unconscious, mechanical. I eat, I drink mechanically. I am a different man from what I was.'

Mescalin intoxication:

1. Dose 0·1 gm. No effect.

2. Dose 0.2 gm. He showed little effect, but said that he felt more cheerful and that things looked clearer. The effect passed off quickly. The following day in the same state as before. Denies that he has been more cheerful. Describes that things had looked much clearer and complains that the effect has gone again.

Case No. 5. Woman, æt. 34 years

Complaint.—Depression with suicidal thoughts and a feeling that everything is unreal.

Family History.—Nothing relevant.

Personal History.—Early development and school history were uneventful. She worked as a chemist's assistant with the same firm for 15 years till the onset of her present illness.

She is said to have been lively and energetic, but had a short depressive illness after influenza four years ago.

For six months before admission she had been getting more and more lethargic and increasingly depressed. On admission her main complaint was that she felt unreal. She was inclined to get into a panic and wanted 'to run away from herself.' Tonsillectomy was recommended, but the thought of this worried the patient greatly, as she feared that an operation would 'separate her entirely from reality.' She felt compelled to repeat things and to go over conversations and actions to make sure that they were all right.

Mescalin intoxication:

1. Dose 0·1 gm. No effect.

2. Dose 0·2 gm. Two hours after getting the drug she began laughing, then crying. She said that she did not know what she wanted, but just thought it funny. When asked if she felt as usual she replied, 'No, it seems different somehow. I feel more muddled now, as if I had to think something out. I don't know what it is.' She wept and repeated her remarks, then looked thoughtful and anxious, covering her face with her arm and shaking her head. When asked if she was frightened she said, 'Yes, I believe I am, of what is going to happen. It all seems such a hopeless muddle, always striving, striving to get out, I can't think. Perhaps I am imagining all this, all this muddle, I'm all right when I am sitting here. Is anything going to happen to me?' 'Does the garden look the same?' 'Yes, the same as yesterday, it is me that is different, I feel as if it will never come right.' 'Have you lost the strange feeling?' 'Yes, and now I feel in a muddle. It is different to what it was this morning, and yet I couldn't go on like I am now, I seem in a muddle, in a trance.'

A week later she felt that she had grown more hopeless about herself since getting the medicine.

Two weeks later she was still depressed, but the feelings of unreality were less marked.

Case No. 6. Woman, æt. 23 years

Complaint.—Inability to stop thinking about herself and about such questions as ' Why am I me ? '

Family History.—Mother had a breakdown at the menopause, nature of which is unknown.

Personal History.—Early development normal. She had the reputation of being a tomboy. She worked as a saleswoman until her marriage at 21. The marriage has been happy ; there are no children.

She has always been temperamental, works hard but spasmodically. She has always been highly sexed. She has always blushed easily and is sensitive about it.

Three weeks before admission she had a sudden choking feeling followed by shivering and fright. She had three similar attacks and then began to complain of an ' awareness of herself.' She became depressed and wanted to be left alone. She said that she wished she was dead. On admission she was depressed and complained, saying ' I'm absolutely conscious of being conscious, I suddenly became outside myself and saw myself. When I am more or less normal I have to keep analysing the feeling.'

Mescalin intoxication.—Doses 0·1 gm. and 0·2 gm.

During intoxication she became very flushed, very interested in the experience, giggled a good deal and then looked profoundly serious and rather bewildered.

She wrote an account of her feelings during her intoxication and another account retrospectively two days later. These accounts are appended.

Self-description A :

How can clumsy words possibly describe, and even then, being translated into other brains (such as doctors), how can one set of feelings, clumsily worded, ever reach another ? How can they understand ? Perhaps they have an entirely wrong impression of my state. It's much too complicated being a person. However can one get back to a nice sensible oneness ? Honestly it's been no joke. I have been kidding myself lately it may have all been thoughts. How have I got the sense to write this ? There is always a person deep down somewhere saying, ' Don't be a damned fool ; don't be theatrical.' No, it has not been just thoughts. I've always been much too sane to allow just plain thoughts to get the upper hand. If I can't have the consolation of thinking that something has definitely gone wrong in my brain and might heal, I might just as well be dead, because if it is just a matter of control, just pure control of my own thoughts, I shall never feel different.

As I hold this pencil, which seems suspended . . . and feels like a piece of india-rubber, I feel just like Alice in Wonderland. This room and myself feel one. When I drank tea it seemed silly to pour it down through the centre of the room. I feel miles away from the paper—and why should I bother. . . .

(Apparently later.)

Now that my body feels more normal I realize my brain is right back to where it started five and a half months ago. I haven't gained an inch ; who am I ? The feeling of time and space, me, all one awe-inspiring whole ? In my desperate struggle to feel normal I can't find a standard of normality—can't remember what normality is. D.D. is quite dead. The five and a half months isn't time, it's a great space of blackness, separating her from this something that is left. I realize, as ever, that this feeling or state is far too delicate, too subtle, too utterly indescribable to put into words.

Self-description B :

I was first made aware of a difference during dinner time, when everything appeared to be faintly tinged with pink, and a bright white light seemed to be over

my head which always lifted away just beyond my sight. Then I lay down and closed my eyes—I think I felt tired and heavy. When I opened my eyes things seemed still pink and jazzing about a bit, so I shifted my position round to the other end of the bed and I looked out of the window. I did my utmost not to think about anything at all. Then up cropped all the old bewilderment. How should I feel anyway? There really was not any standard to judge by—was I worse than I had been the last few weeks? Did I feel so bad as when it all started? I certainly had managed to avoid thinking lately. Yes, these were the old feelings back again—who am I? What am I? What and where is the feeling of being 'me'? What is the feeling of being normal? It was no good, I couldn't remember. My thoughts flew round and round, seeking a proper level—I kept saying: 'Don't think, don't think.' When I sat up, my body felt like lead; I felt hot and my heart was racing. I got off the bed and walked to the mirror, feeling rather like the first signs of influenza. As I looked into the mirror, my face looked all puffed and the pupils of my eyes were immense. I staggered back to bed and nurse pulled the blind. After a while I could make out all kinds of pictures in the weave of the blind—sort of cubic Egyptian designs in red and green. I was kept quite busy and interested for some time, watching these pretty designs. After a while, with the aid of a nurse, I walked out through the dayroom, absolutely on air; my body felt just like indiarubber. I could hardly see owing to the coloured lights—muzzy feelings in my eyes. When the doctor came in I felt hysterical. I can't remember what I said then; I didn't know where I stopped and the room began; we all seemed one big rubber substance, and my voice seemed to come from the corner of the room. At teatime I felt really amused by it all. The spoon felt as if it were made of rubber; my mouth felt as if it were a big warm rubbery thing in the middle of the room down which I was pouring tea. I felt that surely if I let go the cup it would just float away. I remember roaring out laughing; it wasn't a sound, but a pattern. It was just like a fairy tale. I remember thinking, I wonder if I tried hard enough if I could change myself into something else, say a seagull. No, it's no good, my nose is not long enough. Shut up, you fool, lie down and go to sleep. Then I lay down perfectly still and I felt like a block of marble. I could feel my face setting in hard lines. Then I began to think about this awful illness, really it was tragic. D.D. was dead. Imagine, at 22 years of age, with everything to live for, being dead. It was ghastly. I howled with self-pity and remained dejected for the rest of the evening. About 8.30 my body started to come back to normal, but I still feel depressed and hopeless.

Case No. 7. Woman, æt. 22 years

Complaint.—Depression and feelings of unreality.

Family History.—Father is subject to outbursts of temper and home life is unhappy.

Personal History.—She has always been inclined to worry and to be self-conscious. She worked in a printing works until she left at 19 years on account of present illness. Since then she has tried various jobs but never stuck to them. She had a boy friend for two years and dates her illness from the time of parting from this young man when she was 19. She has gradually become increasingly anxious and self-conscious. About four months ago the above-mentioned youth died, and soon afterwards she developed feelings of unreality. On admission she was cooperative, but reserved, tearful and unhappy. She complained that she did things mechanically and that everything appeared strange and unreal. She felt that she had lost her ability to feel emotion. She felt dazed and depressed, sulked miserably and occasionally developed spasmodic twitching of her limbs.

Mescalin intoxication.—Dose 0·1 gm.

During the intoxication she wept and flushed and said, 'I feel as if I am going

away. When I think of Miss M. oh dear, it's awful. I can't make it out, I don't care. I don't care if I die even, it doesn't matter if I die, I could never get better, I don't know which is me, I don't know which is me really. I just don't know where I am or where I have been this terrible long time, I don't know what I'll be next. Awful! I never knew how I felt, I just go on. Doctor, I still seem. . . . Oh dear, oh dear.' Then suddenly she started to laugh, became self-absorbed, would not obey or pay any attention to requests from the doctor, but sat and either smiled quietly or wept quietly, sometimes saying to herself, 'Oh dear, it's terrible, I can't believe I am here.' The effect seemed to be an accentuation of her previous state and the impression was given that she was glad to have a reason to emphasize her illness again.

Retrospective Account written after an Interval of Ten Days:

Shortly after drinking the medicine I began to feel very hot, and my eyes felt strange and when I shut them and opened them I could see little flickering lights; I wanted to push off what I knew was coming on me and tried to act normal, started knitting, but everything was becoming vague. I thought it was the end and I was going out of my mind, I remember looking out of the window and seeing the sunshine, and wanted to be all right, or even the way I was before I took it. I started to walk about, trying to hang on to the atmosphere of the ward and the nurses. You came up to the ward and I went into the clinic; when I sat down a struggle seemed to go on inside me, all things mixed up, like all different people trying to come to the surface. Then a voice started to talk, it did not seem like me, and yet I did not seem to have gone right out, just balancing on the edge. I knew I was sitting in the chair, I remember feeling fascinated by this voice. It was saying, 'I wouldn't mind if I died,' and then I felt the struggle again of being all different people, and felt I didn't know what I was. I looked down at myself and it seemed impossible that it could be me. For five years after I left school I worked at printing, and for a few minutes I seemed to become that person again. Then I felt that I was my sister. All this time the voice wanted me to go on; I wanted to explain that I couldn't go on any longer in the hospital; the atmosphere of the ward and everything else had gone completely. I also seemed to realize fully how long I had been away. I knew before, but could never quite break through. It came over me what a terrible long time it was. I remember crying and feeling amazed because it didn't seem like me. The builders were in the ward at the time, and somehow it all seemed to fit in with something in the past, seemed familiar. The corridor was a street, and I kept thinking that the door was open; I feel sure it was some past atmosphere that I felt. There was a little girl in the ward at the time and I could hear her running up and down, and it all seemed to fit in. I am not sure whether it was my home; it could have been my sister's kiddie; I think they stayed with us when we had some repairs done. It all wore off, and things were as usual, although I felt relieved it was over. I remember feeling very depressed and disconcerted to find myself in the same state, with that awful feeling going on. I really don't know how I am now; I don't know if I am better or worse; it's me all the time. Who am I, what am I? I keep to a sort of routine, and work hard in my home.

Case No. 8. Woman, æt. 24 years

Complaint.—Depression, attacks of feeling unreal and numerous phobias.

Family History.—Parents were caravan-dwellers and little is known about them. Patient was brought up by foster-parents.

Personal History.—As a child she was sensitive, shy and timid, but got on well with others. She was intelligent and serious minded, occasionally stuttered. After leaving school, she went into domestic service.

At 15 years she had a short attack one day of feeling unreal and wanting to scream.

Four months before admission she began to be depressed, had many fears, e.g. of trains, going out alone, making a fool of herself and screaming. She was greatly worried by obsessional thoughts of exceptional nature. She had attacks of feeling unreal, and complained of pains in her head, and nightmares. On admission she looked anxious and bewildered, and was never willing to discuss her troubles frankly. Her main complaint was of feeling unreal and of having impulses to do silly things. She was also horrified by the sexual nature of her obsessional thoughts. During her stay she became more detached, asocial and hypochondriacal.

Mescalin intoxication :

1. Dose 0·1 gm. 2. Dose 0·15 gm.

She denied any effect during the intoxication, but later said : ' When I closed my eyes I could see hundreds of things, like patterns and cartoons, and sort of faces. I could see patterns like linoleum, they kept changing. It was only when I shut my eyes that I saw them, otherwise I would not have noticed anything at all. If I saw a negro then hundreds of profiles flashed past. There was so much, everything went through my mind. It seems silly, shoes were hopping about. Then I saw someone diving and the legs came off. I remember horrid faces grinning, then soldiers marching, hundreds of them. I was interested, not frightened. I wouldn't have known if I had not shut my eyes. I felt further away than I do now, worse. It was sort of interesting, something to remember.' She also stated that some of her obsessional thoughts (' too nasty to tell anyone ') passed through her mind in the form of hallucinations when she closed her eyes.

Case No. 9. Woman, æt. 23 years

Complaint.—Fear of madness, and a feeling that her voice and her body did not belong to her. Thoughts of harming her son.

Family History.—Nothing relevant.

Personal History.—She was a little backward at school and used to worry about it. She was always friendly and popular, attractive but inclined to be selfish. She married at 19. At first she was happy, then she became pregnant, and this caused much unhappiness, as her husband did not want a child, was angry, started to knock her about, and finally left her. She has returned to live with her parents, but she is very discontented, as they treat her like a child and spoil her baby. She has always been excessively tidy and had many little obsessional traits.

She has felt ill for a year, but has been worse for the last four months. She feels as if she was going off her head and has an unreal, dreamlike feeling. She says that her voice sounds strange and rough like a man's and that she has to look down at her feet to see if it is herself. She has had fears of harming her small son who reminds her of her husband. In hospital she was self-centred and irresponsible, did not seem to be anxious to get better or to leave hospital, and her favourite occupation was quietly to make trouble in the ward among other patients.

Mescalin intoxication.—Dose 0·1 gm.

On the following day she said : ' It only made me feel more dead, my head seemed to go more dead. It made the dream feeling worse, I felt more in a dream this morning. When I moved my eyes it felt like moving weights round. When I put a cup to my mouth, it seemed as if I could not feel it, I could not feel my body, I was afraid of going off my head.' She did not describe any change in things around. She wept and said that since getting the medicine she knew that she would not get better. She said that her nerves were dead and that therefore the medicine could not affect her.

Case No. 10. Woman, æt. 28 years

Complaint.—Loss of interest in life and feelings of unreality.

Family History.—One sister gets depressed and worries a great deal.

Personal History.—Early development was normal. She won a scholarship and went to a secondary school until she was 17 years. She then became a shorthand-typist and secretary until her marriage at 23. Married life has not been very satisfactory and has caused her a good deal of worry.

She was always sociable, energetic, cheerful and had many friends, but was inclined to be a worrier.

At 17 years of age she was off work for eight months with an illness during which she lost interest in everything, did not want to meet people, cried a lot and said that she had lost all sense of time. She maintains that she has never properly regained her sense of time. At 26 years of age she had a slight recurrence of similar symptoms.

Eight months before admission, following an infatuation with another man, she began to lose interest in life, could not concentrate, feared she was going insane, and had suicidal thoughts. She complained of having lost her sense of time and of a marked feeling of unreality.

Mescalin intoxication.—Dose 0·2 gm.

She showed marked vasomotor reactions and was affectively labile but on the whole elated. She thought back through her life, pictured herself going home, but only reached the bus stop. She felt thoughts were nearer to her. After lunch she tried to sleep, but could not on account of visual hallucinations. Later she became depressed and wanted to be in her previous condition.

In a retrospective account she wrote : ' I thought about different incidents in my childhood. I felt pleasantly content, but could not say if I felt my natural self. When I pressed my fingers on my eyelids I saw colourful and intricate patterns and made a few poor attempts to draw what I saw. The medicine I had did not alter the feeling I have with regard to time. The evening and next day did not seem any closer to me than before. I thought of my husband, and when the doctor came back I had been crying. After lunch I felt tired with a heavy head and a feeling that my arms and legs were weighted. When told to try and go to sleep, I couldn't. When I shut my eyes I saw what seemed to be rats and mice and I would have seen snakes if I had not kept them away by an effort of will. I also saw a stage with a figure of a girl dressed in pink lying huddled in a corner and all the audience were calling to me that they had killed the person who had taken my place, and that I could now come back. I was waiting for myself to appear on the stage, but I didn't arrive. My mental pictures were clearer after the medicine.'

Case No. 11. Woman, æt. 27 years

Complaint.—Depression. Lack of emotional feelings. Feels changed and unreal. Things look strange. Cannot picture things as she could before.

Family History.—Nothing abnormal.

Personal History.—Early development normal. Got on well at school. Worked as a waitress. Married when 18. Has four children. No sexual desire since last pregnancy, previously normal. Always rather depressed during her menstrual period. As a child for a fortnight ill, (?) ' Saw things yellow.' Twelve months before admission, after birth of fourth child, had nervous breakdown, felt depressed, in the morning more than in the evening, had difficulties in doing her housework. A few months ago and two months ago new attacks of depression with marked depersonalization symptoms. Admitted after suicidal attempt. Depressed, retarded. Occasionally hypnagogic hallucinations and paranoid misinterpretations. Previous personality bright, cheerful, intelligent.

Mescalin intoxication.—Dose 0·2 gm.

Feels like in the hospital where she got her baby. Sees her mother in the hospital. Cannot picture her husband in her mind. Can't think why she cannot look after him. Terribly depressed. Limbs weak. Hands look longer and thinner than before. [Eyes pressed]: Spots like the sun, so bright. Lot of stripes, ivy leaves falling and falling. All different colours coming in. Can see the Rorschach pictures better than she could the other day. Hopes nobody is laughing. [Later]: Worrying went off. No mad feeling. Quiet, contented, perhaps slightly elated. Saw waves of yellow, reminding her of her experiences during her previous illness. [Next day]: Could picture things better than she can to-day.

Self-description:

The first thing I remember was having the medicine about 10 a.m. Then as soon as I had taken it I felt I was falling through the bed and felt very weak. Then I had an awful fear that the nurse that was with the doctor was laughing at me. After that I went through all the worries of money matters and the other things that had been such a trouble to keep going and yet lost everything in the world, but after that I could not worry about anything. I just had a feeling that I would give everything to die so that . . . [her husband] could enjoy his life. I felt just as I do now. What is the good of living when you can't seem to enjoy anything and have lost all your love for your own children? But what I could not make out was, I felt just as if everything was in a dream, and yet I could tell anyone the name of the people that passed the door, when they were going to the concert in the evening. At the time I had not any idea of what time of the day it was.

I also had the fears that I have had, such as that my brain had gone; also that it was only God that was telling me what to say so that I would not be laughed at and be put away in a mental hospital. . . . I also felt that I could not turn on the left side; for one thing my left arm was very heavy and if I turned on that side I had the awful swelling in my head again, and felt as if I was going off into one of those awful faints again like I used to.

I do not know why I am writing this even now, although things seem more real to me. I shall feel as if I do things just because I am told to do. I never really enjoy anything, and yet I keep with people all the time and seem to be able to enter into the conversation all the time.

I also remember that I wanted to look in the mirror and to keep looking on my hands all the time. It seemed that something made me look at my hands. In the evening I kept crying and just for a second I wanted to go home, but what for I don't know. I just wanted to get out of here. . . .

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THE EFFECTIVE USE OF SMALL NON-DEHYDRATING DOSES OF EPSOM SALT IN EPILEPSY: A STUDY OF ONE HUNDRED AND NINE CASES*

By

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Elevation of blood magnesium to excess produces coma.[1] Elevation of blood magnesium in moderation produces drowsiness. This sedative effect is applied therapeutically in the control of uræmic [2] and eclamptic [3] convulsions by intravenous magnesium sulphate.

The converse of this, depression of blood magnesium, produces parathyroid tetany. The latter has been developed experimentally in rats [4] on diets deficient in magnesium and may occur clinically with low blood magnesium.[5] Nevertheless, there is no change in magnesæmia after removal of the parathyroid glands in animals.[6] Convulsions with hypomagnesæmia have been described in other conditions, such as chorea and pneumonia.[5]

Hirschfelder [5] recently reported 10 patients with low blood magnesium, who suffered from convulsions or muscular twitchings. Four of these patients had kidney lesions. After single 20 to 25 gm. doses of Epsom salt were administered by mouth to these four, the magnesium in the plasma rose almost to double the normal concentration within four to six hours, and the twitchings or seizures subsided. Hirschfelder concluded that convulsions are relieved by oral magnesium sulphate in patients with renal insufficiency.

METHOD

In view of these findings the blood magnesium in a series of patients subject to epileptiform seizures was studied at St. Elizabeth's Hospital. A normal value for magnesium in blood was first established. Colorimetric estimation on Folin-Wu blood filtrate with titan yellow as the specific reagent, a modification of the Hirschfelder and Serles technique,[7] was used. In a group of 15 controls findings ranged from 2·9 to 4·0 mgm. of magnesium per 100 c.cm. of whole blood. The controls were individuals most of whom had never taken a dose of Epsom salt or milk of magnesia, the remainder not having had either cathartic for six months prior to the estimations. They

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consisted of nine cases of dementia præcox, two of general paresis not subject to convulsions, one patient formerly epileptic, but free from fits for ten years, two technicians and the writer. An average normal value of 3·61 mgm. of magnesium per 100 c.cm. of whole blood was calculated.

One hundred and nine male patients subject to generalized convulsive seizures with loss of consciousness were selected. Prior to similar blood magnesium determinations in these, they were prohibited from having Epsom salt or milk of magnesia for a period of two months to forestall unnaturally high concentrations of magnesium in the blood. In spite of this, estimations in 100 of these patients ranged from 2·67 to 4·8 mgm., with an average value of 3·47 mgm. They were studied for a preliminary six-month period, when the usual methods employed in the treatment of epilepsy were used: phenobarbital, sodium bromide, belladonna, ketogenic diet, fluid limitation, general hygiene, psychotherapy and in some cases an occasional dose of Epsom salt. Following this, the above medication was discontinued, and for a succeeding six-month period, daily, small, measured, oral feedings of magnesium sulphate were administered at 6 a.m. to a group of those patients, who presented low concentrations of magnesium in the blood, using another lot as control epileptics. Doses were so small that diarrhœa did not follow; and fluids were not limited, so that dehydration played no part.

It was thought that the frequency of seizures might be reduced by this procedure for the following reasons:—

1. Rats on magnesium-free diets develop convulsions.

2. Reduction of the plasma magnesium is accompanied by hyper-irritability of the neuromuscular system, occasionally muscular twitchings or convulsions.

3. Intravenous magnesium sulphate controls seizures.

The cases for the administration of magnesium sulphate were selected on the following basis: (1) Comparatively low blood magnesium; (2) frequent seizures; (3) good kidney function, estimated by frequent urine examinations, a blood non-protein nitrogen and concentration and dilution tests when indicated, Hirschfelder [5] having demonstrated the importance of avoiding hypermagnesæmia and resultant coma in kidney disease.

These numbered 74. Their doses of magnesium sulphate were measured in 0·6, 1·0, 2·5, 5·0, 8·5, 11, and 17 gm. quantities, each patient receiving the largest dose that he could take without developing watery stools. The salt was always given in a full 8-ounce glass of water, additional fluid being permitted in unlimited quantity. Each patient was carefully questioned and watched for diarrhœa.

The cases used as control epileptics were selected as such, because: (1) they had normal or high blood magnesium; (2) fewer seizures; (3) poor kidney function or severe illness; (4) they were uncooperative due to psychosis. These numbered 35. They received ½ to 2 ounces of mineral oil every morning.

RESULTS

Under Epsom salt treatment 33 patients (30·3 per cent.) were benefited, improvement being estimated from the decrease in frequency of seizures. For example, convulsions were reduced from 29 to 0, 8 to 0, 3 to 0, 11 to 1, 4 to 1, 3 to 1, 19 to 7, 8 to 3, 17 to 7, etc. One patient who took milk of magnesia was included in this group. Two (1·8 per cent.) died before studies could be completed, six (5·5 per cent.) neither improved nor became worse, and 33 (30·3 per cent.) developed more convulsions. Under mineral oil therapy eight patients (7·3 per cent.) improved, 13 (11·9 per cent.) showed no change and 14 (12·8 per cent.) developed more seizures.

At first glance it would appear that the improvement in 33 and the decline in 33 others under an Epsom salt regime indicated that each group benefited or became worse respectively, purely by chance, and that magnesium sulphate was without effect. Careful study demonstrates that this is not the case. Whereas those patients who improved took magnesium sulphate regularly for the most part, the unimproved by contrast frequently took their medication irregularly. One patient had no convulsions in the six months of salt therapy until the last, when medication was refused. In another case there was a steady decrease in the number of seizures, until the last month, when salts were taken irregularly. Four patients showed terminal increases in seizures with little or no medication in the last months. One man made slight improvement under irregular medication. Of the group who showed the same number or more convulsions with Epsom salt, 15 were extremely uncooperative, rarely taking their medication, and one on milk of magnesia had had the same medicine plus luminal for the first six months. In this salt-poor group there were many who continued to improve, until they began taking the magnesium sulphate irregularly, when occasionally a status epilepticus developed. In these, luminal in heavy dosage had to be administered to terminate a series of convulsions. Even here in these unresponsive cases it was striking that whenever *daily* Epsom salt was taken, that patient did well as long as he maintained this regularity. If, therefore, this large, uncooperative group were added, as it should be, to the controls, those who fared poorly with salts would be decreased by approximately half.

On this basis it may be said that 33 out of 57 cooperative patients benefited, and 15 out of 15 uncooperative patients did poorly under a salt regime. More exactly then, under Epsom salt treatment 33 patients (30·3 per cent.) were benefited, two (1·8 per cent.) died of causes unrelated to treatment, five (4·6 per cent.) neither improved nor became worse and 19 (17·4 per cent.) developed more convulsions. To the mineral oil control group as given may be added a number of uncooperative salt control cases : 14 (12·9 per cent.) who became worse and one (0·9 per cent.) who remained unimproved. Of the eight who improved under mineral oil treatment, two refused medication, leaving only six patients in this group. The actual

decrease in frequency of seizures in these six was practically negligible except in one case in which the fits were reduced from 14 to 5.

As has been stated, salt dosage varied from 0·6 to 17·0 gm. Cases improved on quantities of magnesium sulphate ranging between these values. There was no correlation between degree of improvement and quantity of Epsom salt administered.

In all but three cases the blood magnesium increased under Epsom salt medication. The average blood magnesium after six months of the salt by mouth was 4·43 mgm. per 100 c.cm. of whole blood, the lowest value being 3·5 mgm. and the highest 6·6 mgm. The average increase in blood magnesium over its previous concentration was 0·99, low : 0·10, high : 3·48. There was never sufficient hypermagnesæmia to produce drowsiness or coma, no patients in the salt improved group being nephritic.

Correlation of age and average per cent. improvement (based on the decrease in frequency of seizures) in each diagnostic group indicates that patients with *psychosis with cerebral arteriosclerosis* improved 76·6 per cent.; *dementia præcox*, 72 per cent.; *general paresis*, 60 per cent.; *epilepsy without psychosis*, 59 per cent.; *epilepsy with mental deficiency*, 49 per cent.; and *psychosis with epilepsy*, 33·8 per cent. The only unusual age group, necessarily advanced, lay in the *psychoses with cerebral arteriosclerosis*. No particular colour group, Indian, Negro or Caucasian, benefited more than another.

COMMENT

Nerve tissue normally contains a high percentage of magnesium.[8] It was this fact combined with Hirschfelder's [5] discovery of low blood magnesium in a few epileptics that led to the idea of an elemental deficiency in some forms of paroxysmal convulsive disorder. This conception fails to maintain itself in the light of finding hypermagnesæmia prior to Epsom salt administration in 17 out of 33 patients, who were definitely improved under salt regimen. A low blood magnesium is not therefore by any means a constant in epilepsy. Hirschfelder's idea [5] that there might be a variability of blood magnesium in epileptics, and that periods of hypomagnesæmia might precede or accompany the attacks, is borne out to a certain extent in the finding of 2·89, 3·15 and 3·59 mgm. of magnesium per 100 c.cm. of blood during seizures in three patients. Not one of these responded well to magnesium therapy, however, although two made 9 and 5 per cent. improvement respectively.

It is notable that those patients, who showed more marked increases in blood magnesium after medication, did not develop lesser numbers of seizures. Hirschfelder's [5] patients, however, whose twitchings or convulsions were relieved by Epsom salt, all suffered from renal insufficiency. None of the patients in the present series, who responded to treatment, had pathological kidneys.

The improvement in some, without dehydration, somewhat impugns the idea [9] that Epsom salt is effective in epilepsy through its water-eliminating

power. Besides, recent work [10] indicates that decrease in brain hydration is not of therapeutic aid in epilepsy. The temptation is too great not to record the dubious double entendre : the idea just does not hold water.

Rather, the impression is made that in some cases magnesium sulphate alters physicochemical cell relationships in the brain in a way as yet unknown. Magnesium may have sedative powers by interfering with brain-cell metabolism. Neural charges may be neutralized by the salt in the microscopic batteries that are nerve-cells. Perhaps electrical conductivity or cell charge is reduced—or cell resistance increased—to lessen the frequency of convulsions. But speculation is admission of ignorance. Let it rather be said : magnesium sulphate lessens the frequency of convulsions, not by filling a need where there is deficiency or by dehydrating a brain where there is plethora, but how—we do not know. Further study is required on a group of cooperative, non-psychotic epileptics.

SUMMARY AND CONCLUSIONS

1. The normal range of magnesium is 2·9 to 4·0 mgm. per 100 c.cm. of whole blood with an average value of 3·61 mgm.

2. In 100 epileptics the blood magnesium ranged from 2·67 to 4·80 mgm., with an average value of 3·47 mgm.

3. Thirty-three (58 per cent.) out of 57 cooperative epileptics were helped by small, daily, non-dehydrating doses of Epsom salt.

4. In a control group of 35 patients taking mineral oil and 15 uncooperative patients taking Epsom salt irregularly, only six patients (12 per cent.) showed slight improvement.

5. There was no correlation between degree of improvement and quantity of Epsom salt administered, blood magnesium level, colour or age, except in the *psychoses with cerebral arteriosclerosis*, in which ages, necessarily advanced, ranged from 60 to 73.

6. In 33 improved cases, six diagnostic groups showed the following percentage improvement :—

Psychosis with cerebral arteriosclerosis	76·6 per cent.
Dementia præcox	72·0 ,, ,,
General paresis	60·0 ,, ,,
Epilepsy without psychosis	59·0 ,, ,,
Epilepsy with mental deficiency	49·0 ,, ,,
Psychosis with epilepsy	33·8 ,, ,,

7. Kidney disease was not present in the patients who responded to treatment ; and hypermagnesæmia was never sufficient to produce drowsiness or coma.

8. Three patients showed lower than average blood magnesium during convulsions, but reacted poorly to magnesium therapy.

9. Magnesium in small daily dosage is effective in some epileptics neither by filling an elemental deficiency nor by dehydration.

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NON-ALCOHOLIC POLYNEURITIS ASSOCIATED WITH KORSAKOW SYNDROME

By

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The usual association of polyneuritis with a Korsakow syndrome is that caused by alcohol, and the reason for describing these cases is that a Korsakow type of illness associated with polyneuritis which is non-alcoholic in origin is much less common.

CLINICAL DESCRIPTION OF CASES

Case I.—Patient D.D., æt. 25, married, was admitted on January 15, 1934. The history given was that the patient had had one pregnancy which was uneventful. She became pregnant for the second time, and during this pregnancy suffered from œdema, albuminuria and raised blood pressure. Partly owing to these symptoms and partly owing to the fact that the presentation was a breech, labour was induced on October 4, 1933, at another hospital. The labour was difficult, and almost immediately patient developed a temperature of 103° F. as a result of pelvic infection. This lasted until November 14, when the temperature subsided and she appeared to be progressing favourably until the middle of January, 1934. At this time, she became confused, emotionally unstable, and restless, and was transferred to the Maudsley Hospital.

On admission, she was elated and euphoric, said everything was lovely and addressed everyone as 'darling.' She talked in a rambling manner, was restless, confused, and disorientated. She was also incontinent of urine and fæces. Physically she was thin and 'drawn' and complained of pain in the left leg. The quadriceps on both sides together with all the muscles below the knees was paralysed. The paralysis was of a flaccid type and was more complete on the right than the left side. Patchy anæsthesia to pinprick was present up to the level of the umbilicus, and sensation of touch, temperature, deep pressure and joint sense was abolished in both feet, more so on the right than the left side. She also complained of paræsthesiæ in the form of 'pins and needles' in both feet. The left leg was swollen and œdematous. There was a zone of hyperæsthesia to pinprick present at the level of the umbilicus. Fine horizontal nystagmus to both sides and some slight weakness in the arms were present. The deep reflexes in the legs were completely absent and were markedly sluggish in the arms. A blood count showed 3,745,000 red cells with a colour index of 0·75 and slight anisocytosis and poikilocytosis, the white count being normal. The pelvic organs revealed nothing abnormal.

A few days after admission she developed copious diarrhœa with as many as 20 stools a day. The blood pressure was low (86/50) and tachycardia was present. Repeated bacteriological examination of the stools was negative. The diarrhœa persisted until February, 1934, and until then she was given intravenous salines and glucose. At this time she complained of paræsthesiæ in the hands and the pulse rate had risen to 130. Mentally she remained confused and disorientated and at times was noisy and restless. In addition confabulation was present. A blood count at

this time was normal except for a colour index of 0·85; the cerebrospinal fluid was negative apart from a slight increase of protein to 100 mgm. per cent.

In view of the persistence of the tachycardia and the delirious symptoms a search for a focus of infection was carried out but was completely negative. The right antrum was punctured, as it was regarded as being suspicious on X-ray examination but no pus was found. At no time during her stay in the Maudsley Hospital was there any pyrexia. At the end of March the patient showed a sort of occupational delirium. She mistook identities, said she was being attacked, and was still confabulating. There was also present wasting of the small muscles of the hand with patchy anæsthesia to pinprick. The electrical reactions were normal except that the response to faradism in the small muscles of the right thumb was diminished. In the legs reaction of degeneration was complete in both groups of anterior tibial muscles. At the beginning of April an improvement in her mental state was noted, and this became steadily progressive. At the same time the paresis in the hands began to improve. She was discharged on May 16, 1935, when her mental state was normal, but the double footdrop was still present. She was seen on November 15, 1935, when she was very well mentally, the hands were normal and the left foot had improved considerably. The right foot still showed a marked degree of footdrop, but is responding slowly to massage and electrical treatment.

Case II.—Patient M.I., æt. 45, married, was admitted on June 3, 1933. The history given was that three weeks before admission patient had a cold and was admitted to a general hospital for observation as it was thought she might have tuberculosis. This, however, was not confirmed. She had also become depressed, lost weight and complained of pain in the right leg. Whilst in the general hospital she became restless and confused and was transferred to the Maudsley Hospital.

The previous history was negative, and patient had had two pregnancies (12 and 14 years before) without incident. On admission she was restless, mistook identities, said the patients were going to be burnt, and was confused and disorientated. She also showed confabulation. These symptoms were much more marked at night. Physically she was thin and pale, and severe diarrhœa was present. Bacteriological examination of the stools showed b. ærtrycke to be present, and the patient's blood also showed agglutination to this organism. She complained of pains and tingling in the legs, and the calves and soles of the feet were tender. Footdrop was present on both sides with wasting of the muscles, the deep reflexes in the legs were sluggish and anæsthesia to pinprick was found in the feet and toes. The right hand and arm were weak, with some wasting of the muscles; the deep reflexes in the arms were diminished, and there was also anæsthesia to pinprick in both hands. The pupils reacted sluggishly to light, while coarse horizontal nystagmus to the left was present. Tachycardia was present (110) and the systolic blood pressure was 115 mm. Hg. The patient showed a low grade type of fever with rises of temperature to 100° F. Bile salts were present in the urine. Patient remained restless, confused, and at times noisy, with considerable memory impairment, until August 30, 1933, when she became quieter and more in touch with her surroundings. Her legs showed little change and the wasting of the intrinsic muscles of the right hand had increased and right wristdrop was present. There was also a tendency to pes cavus on both sides. The kneejerks, however, were now active, but the anklejerks were absent.

Massage and electrical treatment produced steady improvement in the paralysed muscles, and at the same time her mental state became progressively better.

She was discharged on May 5, 1934, with no abnormality except for some residual wasting in the legs.

She attended the Out-patient Department regularly and her legs completely recovered. She remained well, both mentally and physically, until October, 1935, when she became depressed and agitated and it was necessary to send her as a voluntary

patient to her own county mental hospital. She showed no evidence of a Korsakow syndrome or polyneuritis at that time.

Case III.—Patient E.J., æt. 37, married, was admitted on May 1, 1928. Two brothers were said to be alcoholic, but the patient herself denied alcoholic excess. In the previous history the only points of importance were that the patient had an attack of diabetes in 1924, from which she recovered in a few months, and that she had suffered from diphtheria twice.

The present illness was said to have started twelve months before admission, and seven weeks ago she complained of numbness of the fingers, and was forgetful and irritable.

On admission she was anxious, irritable, somewhat histrionic in manner, showed considerable memory impairment but no definite evidence of confusion or confabulation.

Physically she was emaciated, walked with a highstepping gait and had a generalized tremor. The leg muscles were weak and wasted and the deep reflexes were absent. Anæsthesia to pinprick and temperature was present in both legs below both knees, and also in the hands. Vibration and joint sense were absent in the legs. The urine, blood sugar and blood count were all normal. The patient discharged herself shortly after admission when her condition was quite unchanged.

Case IV.—Patient F.F., single, æt. 17, was admitted on November 13, 1933. The previous history was negative except for an attack of diphtheria at the age of seven, after which she was unable to walk for a few months. The history of the present illness was that four weeks before admission she developed pains down the inner sides of both thighs. Three days later her legs became heavy, felt numb and at times they gave way beneath her, and she was also incontinent of urine.

On admission there was weakness and wasting of both legs with difficulty in walking, which she accomplished on a wide base. The kneejerks were present on reinforcement, and anklejerks were very sluggish. There was patchy anæsthesia to pinprick in the legs, while vibration and joint sense were absent. In addition, bilateral horizontal nystagmus was present. Mentally her memory was somewhat impaired and she was facile and euphoric. She improved rapidly after admission and was discharged on January 27, 1934.

DISCUSSION

Case I differs from the other three cases in that it was associated with pregnancy and the puerperium, and will be discussed first.

For some considerable time it was maintained that polyneuritis occurring during pregnancy was due solely to the toxæmia of that state, which was responsible also for other symptoms such as albuminuria, eclampsia, vomiting, etc. Ely [1] described the condition in pregnant women who suffered from excessive vomiting also and ascribed the two conditions to the toxæmia. Other authorities (Ledoux, Dupouy and Courtois) hold this view and have reported recovery from the condition after termination of the pregnancy. Hoffman [2] believes that the polyneuritis is due to toxæmia, and states that the condition occurs most frequently in the first or second pregnancies; it is associated with excessive vomiting and develops after the vomiting ceases in the fourth or fifth month.

More recently various writers have tended to discard the toxæmia theory and subscribe to avitaminosis as being the deciding ætiological factor. At the present time there appears to be some confusion regarding the nomen-

clature of vitamins, particularly vitamin B complex. Vitamin B complex is divided into B, B_1, B_2, B_3, B_4, B_5, and B_6. The existence of the three latter is somewhat doubtful and in any case they are of no importance, as far as is known, in the ætiology of polyneuritis. In this paper, by B_1 is meant the antiberiberi vitamin which is sometimes referred to by American biochemists as B, while by B_2 is meant the antipellagric vitamin which is sometimes referred to as G. Strauss and Macdonald [3] state that deficiency of vitamin B_2 causes the anæmias of pregnancy, and that these in turn reduce gastric secretion and produce vomiting. They maintain that the clinical picture of polyneuritis associated with pregnancy is identical with that of beriberi, and they quote the successful treatment of three cases with yeast (containing vitamins B_1 and B_2), cod liver oil and iron. Ungley [4] described a familial type of polyneuritis occurring in pregnancy and the puerperium, and found no evidence of vitamin B deficiency. Cowgill,[5] on the other hand, secured relief of symptoms by feeding with vitamin B complex in cases of polyneuritis associated with pregnancy, and he found that in the gastric juice of pregnant women there was deficiency or absence of hydrochloric acid. This produced loss of appetite, which in turn caused avitaminosis with increased loss of appetite, and according to him a vicious circle was set up. Mellanby [6] regards deficiency of vitamin A as an important factor in the development of puerperal septicæmia, but in this case there is no evidence that there was any absence of vitamin A during pregnancy.

It will be seen that there is still considerable doubt as to the ætiology of this condition, and it is probable that several factors may determine the illness.

Thus in Case I there was undoubted evidence of toxæmia during the pregnancy, as shown by the albuminuria, œdema and raised blood pressure. On the other hand, there was no history of excessive vomiting. Secondly, there was the severe infection after the puerperium in the form of a septicæmia, and this may have been an important ætiological factor. After the polyneuritis had developed there was a severe gastrointestinal upset, as manifested by the profuse diarrhœa. This may have resulted, at that time, in an avitaminosis which may have aggravated the polyneuritis which was already present.

It seems impossible to ignore the toxæmia of pregnancy, the septic infection, and possibly the gastrointestinal one also (although no organisms were isolated) as ætiological factors ; as already mentioned, too, avitaminosis may have contributed, although there was no direct evidence for this.

Regarding polyneuritis not associated with pregnancy, many authorities also believe that the condition is determined by avitaminosis. Wechsler [7] believes that polyneuritis due to specific factors, such as alcohol, diabetes, etc., may be *determined* by avitaminosis. He states that alcohol attacks the liver and gastrointestinal tract, causing loss of appetite and vomiting, which result in non-absorption or assimilation of vitamins. He also states that diabetics

are deprived of vitamins as a result of their restricted diet, and that the absence of vitamin B_1 or B_2 is the determining factor in all cases of neuritis. Strauss and Cobb [8] agree with this and report more rapid recoveries as a result of prescribing vitamins. Perry [9] advances similar views and states that absence of vitamins A and C may give a clinical picture of multiple neuritis.

Mellanby [10] experimented with puppies, and after feeding them for a period of three to four months on a diet deficient in vitamin A produced degenerative changes in the spinal cord which he demonstrated with Marchi's stain. He stated that the animals showed the same symptoms as those fed on a diet deficient in vitamin B complex, and that the symptoms were aggravated if they were fed at the same time on wheat germ or ergot. If, however, the animals were given vitamin A or carotene, this prevented the effect of the ergot, and he concluded that degeneration of the cord is controlled by two factors, viz. a positive harmful influence or toxin and the absence of a defending mechanism, i.e. vitamin A.

Grinker and Kandel [11] disagree with Mellanby, and maintain that the apparent ataxia is due to weakness and loss of weight, that no corroborative stains for fats other than Marchi's method were used, and that this method often produces artefacts. Grinker and Kandel, however, experimented on rats, in which they were unable to produce changes in the nervous system, although the animals showed loss of weight, weakness and ataxia, which cleared up on feeding with vitamin B complex. They also fed monkeys on a diet deficient in vitamin A and were unable to show any definite degeneration of the central nervous system. They concluded that vitamin deficiency does not produce degeneration of nerve-fibres, although its effect on ganglion-cells of the central nervous system (' central neuritis ' of Adolf Meyer) may, if the duration is long enough, endanger the existence of many nerve-fibres and the vascular damage may eventually produce secondary ischæmic effects. Zimmerman [12] found it difficult to produce neurological deficiency of vitamin B complex in rats and thought they stored this to such an extent that it was impossible to deplete them, whereas in dogs marked peripheral polyneuritis of a purely degenerative type affecting the myelin sheaths could be produced. Von Hofmeister,[13] on the other hand, showed that polyneuritis can result in rats from deficiency and not absence of the antineuritic vitamin.

It will be seen that the question as to how far avitaminosis can determine degeneration in the nervous system is still a very open question. In Case II of the series there was, firstly, the history of infection with a cold, and, secondly, the gastrointestinal infection with b. ærtrycke. As in Case I, it is possible that the polyneuritis may have resulted from the ærtrycke infection and may have been aggravated by avitaminosis resulting from the profuse diarrhœa.

In Cases III and IV there were no obvious ætiological factors, except that in Case III there was a history of an earlier attack of diabetes, although there

was no clinical or laboratory evidence of this while the patient was in hospital. In Case IV the only factor present was that the patient had had an attack of diphtheritic polyneuritis at the age of seven, and it is a well-recognized fact that one attack of polyneuritis leaves a predisposition to a further one.

At the present time it would appear undesirable to dogmatize as to the etiology of these cases, and best to retain an open mind and to regard both the toxic and deficiency factors as being important.

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A SURVEY OF THE PATIENTS IN A LARGE MENTAL HOSPITAL

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INTRODUCTION

ALTHOUGH, from the legal points of view, all individuals certified as of unsound mind have the same designation, every large mental institution contains a great variety of different types of patient, especially since the passing of the 1930 Mental Treatment Act. In Part I of the *Annual Report of the Board of Control for 1933*, for example, it was stated that at least 12·2 per cent. of patients, certified under the Lunacy Acts, in general mental hospitals were mentally defective but not insane. As the years go by, an institutional population becomes saturated with chronic types, for many of the acute cases are discharged recovered. It is interesting and of some practical importance to know exactly what types of patients inhabit a mental hospital at a given time and how the resident population differs in composition from a sample of admissions. The present communication gives an account of a survey, the object of which was to obtain full information about the incidence, in Severalls Mental Hospital, of the various types of mentally disordered and mentally defective patients. Every resident patient was seen by the writers, and the records of each case were examined; a diagnosis of the type of mental disorder was made and also an estimate of the patient's initial mental capacity. Naturally, in some instances when the mental disorder had caused dementia, the estimate of the patient's initial mental capacity had to be made upon historical evidence rather than from direct examination.

While recognizing that, according to existing knowledge, any classification of mental disorders must be incomplete, the writers felt that the schedules 'Forms of Insanity' and 'Causes and Associated Factors of Insanity' in the *Rules of the Commissioners in Lunacy* could not offer a satisfactory basis for the proposed survey. The diagnosis recorded in the hospital registers is often made at a time too early in the observation of the patient to be accurate and complete. In many cases the restrictions of the Commissioners' Schedules actually compel the recording of a diagnosis known to be inaccurate. A frequent example of this is the case of a patient whose certification has been necessitated by symptoms of mental deficiency 'not amounting to imbecility'; the medical officer must then either register the patient as an imbecile, or

allow his imagination to read into the instability associated with feeble-mindedness a psychosis which he knows is not present. This is, perhaps, not the place to suggest a revision of the Commissioners' Schedules; it was clear, however, to the writers at the outset that they could not be used as the foundation of a statistical survey. It was necessary, therefore, to develop a simple method of cross-classification of mental disorder and defect.

In respect of the diagnosis of mental disorder, the patients were grouped under five main headings: (i) *schizophrenia*, which included dementia simplex, dementia præcox, dementia paranoides, paraphrenia and paranoia; (ii) *organic insanities*, which included general paralysis, toxic and traumatic states, involutional depressive, delusional and manic states, and senile dementia; (iii) *manic-depressive insanity;* (iv) *epileptic psychosis;* (v) *cases without definite psychotic symptoms*, a group which included neurosis, psychoneurosis, emotional instability, and mental defect uncomplicated by mental disorder.

Mental capacity was partly rated on the patient's ability to answer a few standardized questions, taken from Burt's *Mental and Scholastic Tests*, of which the reading tests were found to be the most useful. The patient's past history and, in particular, the school record were also taken into consideration. Until recently, in many schools, the mental grade and the school standard were closely correlated. Any patients now over the age of about 25 who had not reached Standard V on leaving school at the age of 14 and any patients who were judged to have been incapable of reaching a mental age above nine or ten years were classed as mentally defective. Six categories of mental ability were chosen: (i) superior; (ii) normal; (iii) dull; (iv) feebleminded (mental age of seven to nine or ten years); (v) imbecile (mental age of three to seven years); (vi) idiot (mental age below three years). The category of dullness included many patients who could not be said to be certifiably defective, but who were, nevertheless, subnormal. On the whole,

TABLE I

Patients in the Hospital (Resident Population), January, 1935

Mental Grade	Schizophrenia		Organic		Manic-depressive		Epilepsy		No psychosis		Totals	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Superior .	6	12	5	5	2	1	2	1	—	—	15	19
Normal .	252	441	135	211	44	107	21	16	1	3	453	778
Dull . .	143	164	40	45	27	36	16	10	6	3	232	258
Feebleminded	57	58	6	11	26	38	15	17	23	28	127	152
Imbecile .	2	5	1	—	1	5	12	6	29	25	45	41
Idiot . .	—	—	—	—	—	—	—	2	8	4	8	6
Total .	460	680	187	272	100	187	66	52	67	63	880	1,254

the estimate of mental deficiency was cautiously made and many patients in whom feeblemindedness was suspected, but in whom it could not be definitely proved to exist, were given the benefit of the doubt and counted as dull or as normal.

GENERAL RESULTS

The total population of the hospital was 2,134 patients, of whom 880 were males and 1,254 females. The results of the classification of these patients are summarized in Tables I to VI. Some general deductions from these figures will first be considered. Taking Table I, in both sexes, together, the percentages of patients who fell into the different categories were as follows :—

Type of Disorder	Percentage
Schizophrenia	53·4
Organic	21·5
Manic-depressive	13·4
Epilepsy	5·5
No psychosis	6·1

Mental Grade	Percentage
Superior	1·6
Normal	57·7
Dull	23·0
Feebleminded	13·1
Imbecile	4·0
Idiot	0·7

Perhaps the most striking fact which emerges from these figures is the high incidence of mental subnormality. The total number of mentally subnormal patients is 869, or 40·8 per cent., of whom 412 are males and 457 females. There were 180 males and 199 females, that is 17·8 per cent. of all patients, who could have been certified under the Mental Deficiency Acts. No psychosis was diagnosed in 130 cases (67 males and 63 females) and of such patients the great majority (60 males and 57 females) were mentally defective; cases of deficiency uncomplicated by mental disorder numbered 70 (40 males and 30 females). The proportions of mentally subnormal patients, in the various psychiatrical divisions, were as follows :—

Type of disorder	Dull	Mentally defective
	Per cent.	Per cent.
Schizophrenia	26·9	10·7
Organic	18·5	3·9
Manic-depressive	22·0	24·4
Epilepsy	22·0	44·1
No psychosis	6·9	90·0

In the whole population females predominate over males, but there are relatively more male than female defectives: a similar relative excess of

males (in a lesser degree) applies to patients diagnosed as mentally dull. Consequently in those types of mental disorder, such as epilepsy, which are closely associated with mental deficiency, there is a slight relative excess of males. Schizophrenia, the organic psychoses and manic-depressive insanity all show, in a like degree, an excess of females.

A detailed analysis of the incidence of different types of schizophrenia revealed that the paranoid types were much more common among females than among males; the paranoid psychoses seemed also to develop with greater frequency in individuals of normal than in those of weak intellect. These points are readily shown by the following figures.

	Number	Females	Dull	Mentally defective
		Per cent.	Per cent.	Per cent.
Paranoia . . . . Paraphrenia . . .	38	79	11	5
Dementia paranoides . .	256	72	22	5
Dementia præcox (all other forms)	836	55	18	13

An analysis of manic-depressive insanity showed that the symptoms varied with the patient's mental grade. Besides discovering the numerical association between mental defect and type of psychosis, this survey also suggested that the actual symptoms of a psychosis may be determined by the mental grade. For example, hallucinations, especially visual, in manic-depressive insanity are much more common in the lower mental grades.

Although mental subnormality is not infrequently associated with typical manic-depressive insanity, more often the manifestations of mania or depression in defective patients are of such short duration that they have to be regarded as signs of emotional instability rather than of insanity. The following figures show the proportions of manic-depressive and mentally unstable patients who are dull or defective.

TABLE II

1934 *Admissions*

Mental Grade	Schizophrenia		Organic		Manic-depressive		Epilepsy		No psychosis		Totals	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Superior . .	1	3	1	5	1	—	1	1	—	—	4	9
Normal . .	38	59	58	84	23	35	3	3	3	1	125	182
Dull . .	28	12	20	14	8	9	3	3	3	1	62	39
Feebleminded .	4	5	4	3	4	1	2	2	2	5	16	16
Imbecile . .	2	2	—	—	—	—	1	1	2	1	5	4
Idiot . .	—	—	—	—	—	—	—	—	—	1	—	1
Total . .	73	81	83	106	36	45	10	10	10	9	212	251

	Number	Lull	Mentally defective
		Per cent.	Per cent.
Typical manic-depressive insanity .	272	22	21
Mild forms of manic-depressive insanity	15	13	80
Emotional instability	52	12	87

COMPARISON OF RESIDENT POPULATION WITH ADMISSIONS

In order to investigate further the significance of the different sizes of the specified groupings in Table I, the resident population was compared with the entering population. The sample of the entering population which was chosen comprised the 463 admissions during one year (1934) (see Table II). These patients were classified in the specified way according to type of mental disorder and grade. The following figures show how they compare with the resident population.

Type of disorder	Resident population	1934 Admissions
	Per cent.	Per cent.
Schizophrenia	53·4	33·3
Organic	21·5	40·8
Manic-depressive	13·4	17·5
Epilepsy	5·5	4·3
No psychosis	6·1	4·1

Mental grade	Resident population	1934 Admissions
	Per cent.	Per cent.
Superior	1·6	2·8
Normal	57·7	66·3
Dull	23·0	21·8
Feebleminded	13·1	6·9
Imbecile	4·0	1·9
Idiot	0·7	0·2

In comparing these figures, it must be remembered that a diagnosis made during the first year after admission may be inaccurate. Cases diagnosed as manic-depressive or confusional may afterwards develop symptoms which necessitate their inclusion in the schizophrenic group; a case may even be admitted and discharged as manic-depressive and yet be subsequently admitted as schizophrenic. It is seen that, though the schizophrenics form the largest class in the resident population, among the admissions they are fewer in number than the organic cases.[7] The manic-depressive cases are, proportionately, nearly as frequent among the resident population as among admissions, probably because, although many recover temporarily, they have

a strong tendency to relapse. The epileptics and those showing no definite psychosis have a greater frequency in the resident population than among the admissions, chiefly because they contain such a large number of mentally defective individuals. This point is further illustrated in the comparison of proportions of different mental grades in the admissions and in the resident population. The likelihood of an individual's remaining in the hospital is high if the mental grade on admission is found to be low.

The total number of patients admitted who were found to be mentally subnormal was 143, of whom 42 were certifiably defective. As in the resident group, a large proportion who had no definite psychosis were defective, i.e. 11 out of 19. The proportion of epileptics admitted who were defective was also high—six out of 20. On the other hand, the relatively high proportion of manic-depressives judged to be defective in the resident group was not shown among the admissions ; only five were found out of 81. Of those admitted suffering from organic insanity, only seven out of 189 were judged to be mentally defective : this psychiatric group therefore had, among admissions as in the resident population, the highest average mental grade. The schizophrenics admitted contained 13 defectives out of 154 cases ; the proportion, 8·4 per cent., is practically the same as the proportion among manic-depressive admissions and agrees with the proportion found in the resident population of schizophrenics. The comparison of the admissions with the resident population enables us to say with some degree of assurance that mental subnormality and deficiency are least prominent in the organic insanities, and that 9 or 10 per cent. of schizophrenics and a much higher proportion of epileptics are mentally defective. The difficulty in distinguishing between true manic-depressive insanity and the symptoms of emotional instability shown by feebleminded individuals throws some doubt on the apparent association between manic-depressive insanity and mental deficiency. Nevertheless, it appears that this association is fairly marked, and that, next to epilepsy, the manic-depressive type of reaction is the commonest psychosis among the mentally defective.

TABLE IIIA

Resident Population Analysed According to Length of Time Since Admission

Type of disorder	0–5 years	5–10 years	10–15 years	15–20 years	20 years +
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Schizophrenia . .	45·3	53·5	55·0	57·4	69·8
Organic . . .	32·3	23·4	12·9	8·8	8·0
Manic-depressive .	14·8	13·6	16·2	13·9	7·4
Epileptic . . .	4·6	6·9	6·8	11·1	2·2
No psychosis . .	3·1	2·6	9·1	8·8	12·6
Total number . .	899	346	309	216	364

TABLE IIIB

Resident Population Analysed According to Length of Time Since Admission

Mental grade	0–5 years	5–10 years	10–15 years	15–20 years	20 years +
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Superior . . .	2·6	0·9	1·0	1·4	0·5
Normal . . .	61·3	59·5	52·8	48·6	56·6
Dull . . .	24·2	22·8	23·6	25·9	17·6
Feebleminded . .	9·5	13·3	17·2	17·6	15·7
Imbecile . . .	1·9	3·2	3·6	6·5	9·1
Idiot . . .	0·6	0·3	1·9	—	0·5
Total number . .	899	346	309	216	364

Further information concerning the subsequent history of patients of different types and grades, who enter the mental hospital, can be gleaned from the more detailed analysis of the resident population which is given in Tables IIIA and IIIB. The proportion of schizophrenics steadily rises in any sample of patients as the length of time of residence increases, whilst the proportion of organic cases falls off rapidly. Setting aside the group of chronic non-psychotics who are mostly mentally defective, few patients other than schizophrenics stay in the hospital more than 20 years. The proportion of patients of normal intelligence decreases with length of time of residence up to more than 15 years; but the patients admitted more than 20 years ago appear to include a larger proportion again (56·6 per cent.) of those of the normal grade. Possibly too many of the patients who had been in the hospital for this long period were rated as normal owing to incomplete histories. Patients of the idiot grade scarcely figure in the groups resident in the hospital for over 15 years, but the duration of residence of many imbeciles has been very long. It must be remembered, when examining these figures, that the operation of the Mental Deficiency Acts has become increasingly effective and fewer imbeciles are admitted now per year than 20 years ago.

Apart from administrative considerations, the differences between the composition of the specified groups in the entering and resident populations are determined by the powers of recovery and the life expectation of the patients admitted. Table IV shows what happens to the admissions of various types and grades. The schizophrenics are, on the whole, young on admission and few are discharged. Conversely, the organic cases are mostly elderly on admission and many of them succumb to illness. The manic-depressives show much the highest discharge rate of any group. Where mental grade is concerned, it is fairly clear that the silting up of dull and defective patients in the residue is caused partly by reason of their good health and partly by reason of the low rate of their discharge.

TABLE IV

1934 *Admissions*

Type of disorder	Mean age in years on admission	(Mean length of time of residence in hospital—six months)	
		Discharged	Died in 1934
		Per cent.	Per cent.
Schizophrenia	31·7	21	3
Organic	54·5	14	19
Manic-depressive	47·2	40	6
Epileptic	33·4	20	5
No psychosis	35·5	42	5

Mental grade	Mean age in years on admission	(Mean length of time of residence in hospital—six months)	
		Discharged	Died in 1934
		Per cent.	Per cent.
Superior	40·3	25	0
Normal	46·0	43	15
Dull	40·7	21	5
Feebleminded	38·0	22	6
Imbecile	37·8	11	0
Idiot	37·0	0	0

PHYSICAL MEASUREMENTS

As far as was practicable, in the course of the survey which is here reported upon, each patient's stature was noted and the head length and breadth were measured. Patients below the age of 19 years were excluded from this part of the investigation. Table V records the mean heights of patients classified according to type of disorder and mental grade. Males and females had to be considered separately. The average heights in schizophrenia, organic psychosis and manic-depressive insanity are reasonably similar to one another, but the non-psychotic are definitely shorter in stature. This difference is likely to be due to the presence, among the non-psychotic group, of a large number of patients of low grade mentality who are, on the average, considerably shorter than those of normal mentality. Both the male and the female average statures are closely associated with degree of intelligence, and the regularity of this association is quite surprising. This correlation of stature with mental grade was also evident for any given type of mental disorder. Our figures here can be used to test whether schizophrenics, who are supposed, by Kretschmer, to be predominantly tall and thin, have greater stature than manic-depressives, who are said to tend to be short and fat, and we find no evidence that this view is correct.

TABLE V

Type of disorder	Males		Females	
	No. of cases	Average height	No. of cases	Average height *
Schizophrenia	441	5 ft. 6·1 in.	626	5 ft. 1·8 in.
Organic	177	5 ft. 5·5 in.	258	5 ft. 1·2 in.
Manic-depressive	96	5 ft. 6·3 in.	179	5 ft. 1·0 in.
Epilepsy	61	5 ft. 5·5 in.	46	5 ft. 1·1 in.
No psychosis	56	5 ft. 4·9 in.	54	4 ft. 11·6 in.
Mental grade	**Males**		**Females**	
	No. of cases	Average height	No. of cases	Average height
Superior	15	5 ft. 6·6 in.	18	5 ft. 3·7 in.
Normal	436	5 ft. 6·1 in.	735	5 ft. 1·7 in.
Dull	220	5 ft. 5·9 in.	235	5 ft. 1·3 in.
Feebleminded	117	5 ft. 5·6 in.	135	5 ft. 0·4 in.
Imbecile	40	5 ft. 4·0 in.	35	4 ft. 11·2 in.
Idiot	3	5 ft. 4·3 in.	5	4 ft. 7·1 in.

* The standard deviation of female stature is 2·76 in., and that of male stature 2·77 in.

It has been pointed out by many workers that there is a certain degree of association between size and mental ability.[1, 2] The mean stature for the total institutional population here is significantly below the average height for English people. If, however, we take merely those of normal ability, the diminution is slight. There is difficulty in knowing exactly what is the mean stature of normal members of the community: generally accepted figures are 5 feet 7½ inches for Englishmen and about 5 feet 2½ inches for Englishwomen.

Head measurements were taken in a large number of cases, and the results of this inquiry were very similar to those of the measurements of stature. Head size, however, is subject to certain variations which are liable to make averages unsatisfactory. There were two hydrocephalic male idiots, and the inclusion of their measurements tended to make the average head length and breadth for male idiots somewhat unusually large. The means for males and females, according to type of disorder and mental grade, are given in Table VI. It is fairly evident from these figures that mental grade is a factor of more importance here than type of disorder. There is little variation between the mean head measurements in different psychiatric groups and that which exists can be attributed to the differing compositions of these groups in respect of mental grade. Head size does not appear to be affected

TABLE VI

Type of disorder	Males			Females		
	No. of cases	Average head length	Average head breadth	No. of cases	Average head length	Average head breadth
Schizophrenia	379	195	151	517	184	145
Organic	124	195	151	168	185	146
Manic-depressive	71	193	151	140	185	145
Epilepsy	50	193	151	49	182	142
No psychosis	58	192	149	52	181	144

Mental grade	Males			Females		
	No. of cases	Average head length	Average head breadth	No. of cases	Average head length	Average head breadth
Superior	14	196	152	14	183	146
Normal	339	195	152	553	185	145
Dull	175	194	151	196	185	145
Feebleminded	109	193	150	120	182	144
Imbecile	37	190	148	37	179	141
Idiot	8	194	152	6	178	139

to any great extent by nutrition; the mean head size can therefore be regarded as an accurate index of constitutional physique. The average head length and head breadth for adult males and females in Australia have been measured with the following result :—

Head Size (Australians, Melbourne) [3]

Normal males		Normal females	
Head length	Head breadth	Head length	Head breadth
194	153	185	146

These averages do not differ significantly from those found for our patients of normal mental ability. Several investigators have reported that head size and stature are abnormally small in mental hospital populations.[4] From our figures it appears that such results may have been due to the inclusion in the sample of a large proportion of defectives.

STIGMATA

The male patients were examined for the presence and absence of certain stigmata of degeneration, namely, abnormal palate, skeletal deformity and post-anal dimple. The proportion of abnormal palates found among males was 12·31 per cent. The following figures show the incidence of abnormal palates among resident patients belonging to the different specified groups.

Incidence of Abnormal Palate (Males)

Type of disorder	Number	Percentage
Schizophrenia	52	11·4
Organic	15	8·1
Manic-depressive	9	9·0
Epilepsy	17	25·8
No psychosis	15	22·4
Mental grade	**Number**	**Percentage**
Superior, Normal	44	9·4
Dull	22	9·6
Feebleminded	26	20·5
Imbecile, Idiot	16	30·2

Under the type of disorder grouping it is noticeable that about one-quarter of epileptics and non-psychotics have abnormally narrow palates. Between the schizophrenics, organic cases and manic-depressives there is not very much difference: these types all show a lower incidence. On the other hand, there is a marked association between abnormal palate and mental subnormality, as can be seen from examination of the figures in the mental grade grouping. The high proportion of epileptics and non-psychotics who have this abnormality is thus to be expected.

Patients of low mental grade exhibited skeletal abnormalities frequently; hence a high incidence among epileptics and non-psychotics was again to be expected. The following figures show the incidence of skeletal abnormalities in the different groupings.

Incidence of Skeletal Abnormalities (Males)

Type of disorder	Number	Percentage
Schizophrenia	17	3·7
Organic	3	1·6
Manic-depressive	2	2·0
Epilepsy	4	6·1
No psychosis	7	10·4
Mental grade	**Number**	**Percentage**
Superior, Normal	15	3·2
Dull	6	2·6
Feebleminded	5	3·9
Imbecile, Idiot	7	13·2

Skeletal abnormalities included cranial deformities (asymmetry of skull, hydrocephaly, acrocephaly, etc.) and deformities of the spine or limbs (scoliosis, kyphosis, spina bifida, syndactyly, club foot, etc.).

A post-anal dimple, marking the site of the posterior end of the primitive neural canal, is a normal surface marking. Sometimes, however, it is unusually deep, and it may even be represented by a narrow blind canal running upwards for 2 cm. or more. Every male patient in the hospital had been examined, as a routine procedure, for hæmorrhoids and other anal abnormalities, and the presence or absence of a post-anal canal or pathological dimple was noted in every case. The following figures show the marked association of this stigma with epilepsy and with mental defect.

Incidence of Post-anal Dimple

Type of disorder	Number	Percentage
Schizophrenia	13	2·8
Organic	3	1·7
Manic-depressive	2	2·0
Epilepsy	5	7·6
No psychosis	2	3·0

Mental grade	Number	Percentage
Superior, Normal	8	1·7
Dull	7	3·0
Feebleminded, Imbecile, Idiot	10	5·6

FAMILIAL INCIDENCE

Owing to the somewhat incomplete nature of the data on which the following figures are based, the absolute magnitudes of the various proportions recorded cannot be taken to have precise significance. The criteria on which the data are based were not fixed : when it is noted that a relative is affected it is not known whether the relative was mentally defective or whether he suffered from any special type of psychosis. The supposition is often made that the same kind of mental trouble is found in different members of the same family. Little evidence for this view has, however, been obtained from the examination of the pairs of brothers and sisters who are in the hospital. From the clinical point of view mental disease is not very true to type. For example, the known relatives of our manic-depressive patients were more frequently schizophrenic than manic-depressive. The following figures

represent the numbers of patients' parents and sibs who showed some definite psychosis or mental defect. The type of disorder and mental grade of the patients is specified. The figures are given in the form of decimals, which show the number of near relatives affected per patient.

Incidence of Mental Disease or Deficiency among near Relatives of Resident Patients

Type of disorder	Parents		Sibs	
	Number affected	Incidence per patient	Number affected	Incidence per patient
Schizophrenia . .	154	0·135	217	0·190
Organic . . .	40	0·087	70	0·153
Manic-depressive . .	52	0·181	94	0·327
Epilepsy . . .	13	0·110	17	0·144
No psychosis . .	18	0·138	16	0·123
All classes . . .	277	0·130	414	0·193

Mental grade	Parents		Sibs	
	Number affected	Incidence per patient	Number affected	Incidence per patient
Superior . . .	5	0·147	8	0·235
Normal . . .	143	0·116	231	0·188
Dull	71	0·145	107	0·218
Feebleminded . .	42	0·151	57	0·204
Imbecile . . .	13	0·153	11	0·129
Idiot	3	0·214	0	0·000

In so far as the incidence of mental trouble in the near relatives of a patient is evidence of hereditary influence, such influence is clearly more important in manic-depressive insanity than in other clinical types. With epilepsy and the organic psychoses, hereditary predisposition is less marked. It is interesting to note that, among the 459 organic cases, there were 38 suffering from general paralysis. The incidence of mental disease recorded in the relatives of these 38 cases was of the same order as the incidence in other organic cases, i.e. 0·14 for parents and 0·06 for sibs. It is well known that the feebleminded often have feebleminded relatives, though whether this signifies that heredity or environment is the more important ætiological factor is a matter still in dispute. In the present series of cases there is evidence that familial incidence of mental trouble is more marked when the mentality of the patient is low than when it is high ; the differences between the groups are not, however, nearly as marked as in the case of manic-depressive insanity and organic psychosis. The significance of these figures

in the diagnosis of heredity as a cause of insanity can only be appreciated by referring to estimates for the incidence of insanity and mental deficiency in the general population. The expectation of mental disease for any individual has been estimated by Luxemburger to be 0·044: the estimate does not include mental defect. Schultz gave the figure of 0·066 for the total expectation of mental disease and mental defect. In New York State the chance that any male born is treated for mental disorder before his generation passes is 0·047.[5] Apparently the incidence of mental disease and defect is from two to four times as great among the near relatives of patients as in the general community.

SUMMARY

An analysis has been made of the population under the care of a large mental hospital. The cases have been classified according to type of mental disorder and also according to mental grade. The incidence of mental defect was found to be 17·8 per cent. and the incidence of mental dullness 23 per cent. The different types of psychoses showed different degrees of association with mental deficiency; manic-depressive insanity and epilepsy had the strongest association with low mentality.

The way in which the entering population became modified in the course of years was studied in respect of the different psychoses and mental grades.

Physical measurements and stigmata in the different groups were investigated, and it was demonstrated that physical abnormalities were more closely associated with low mental grade than with any special type of psychosis, if due allowance for intelligence of the groups was made. Some data bearing on the familial incidence of mental disorder were also analysed.

The writers are much indebted to Dr. N. Haworth for her help in carrying out the survey and to Miss H. Lang Brown for statistical work.

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RECENT ADVANCES IN THERAPEUTIC (INDUCED) MALARIA

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As experience has accumulated with the extended use of malaria for therapeutic purposes new and interesting observations have been made. Some of these are of value to the malariologist, some to the neurologist, some to the psychiatrist. This article is an attempt at a summary of the more important observations that have been made within recent years. Up to the year 1926, the position of therapeutic malaria was summarized in an earlier work, so that only new facts that have been brought to light since that date will be recorded. Confirmatory evidence will not be described.

INDICATIONS

Dementia paralytica, or general paralysis, remains, as in earlier years, the most important disease suitable for treatment with malaria.

During the period under review many statistics have been published of the results obtained with malaria treatment alone; some of these are shown in Table I.

Table I

Treatment with Malaria Alone

Author	Number treated	Discharged	Improved	Unimproved	Dead	Period of observation
		Per cent.	Per cent.	Per cent.	Per cent.	
Hinsie and Blalock	197	21	—	—	—	4–7 years
Bahr . .	100	25	12	40	23	2 ,,
,, . .	100	30	13	27	30	3 ,,
,, . .	100	29	12	20	39	4 ,,
Nicol . .	176	31	17	24·4	27	9 months to 7 years

Table II shows results obtained by the use of malaria and arsenic in various forms, including tryparsamide (Tennent).

TABLE II

Combined Treatment with Malaria and Arsenic

Author	Number treated	Discharged	Improved	Unimproved	Dead	Period of observation
		Per cent.	Per cent.	Per cent.	Per cent.	
Nicol . .	24	62·5	12·5	13	12·5	9 months to 7 years
Tennent . .	33	36·4	30·3	15·15	18·18	2–7 years
Steel and Nicole .	120	21·65	Unknown 1·66	In hospital 45	31·65	3 years
Nicole and Fitzgerald .	47	25·5	12·74	23·4	—	4–6 ,,
,, .	83	14·47	8·44	16·87	—	7–10 ,,
,, .	36	16·65	—	13·9	—	10 ,,

Table III records series of cases treated, some with malaria alone, others with arsenic in addition.

TABLE III

Treatment of Cases, Some with Malaria alone, Others with Malaria and Arsenic

Author	Number treated	Discharged	In hospital	Dead	Period of observation
		Per cent.	Per cent.	Per cent.	
Reid . . .	33	27	49	24	1 year
,, . . .	17	30	35	35	2 years
,, . . .	10	10	30	60	3 ,,
,, . . .	35	23	26	51	4 ,,
,, . . .	31	35	23	42	5 ,,
,, . . .	30	16	27	57	6 ,,
,, . . .	20	20	15	65	7 ,,
,, . . .	40	13	17	70	8 ,,
,, . . .	9	11	11	78	9 ,,
Meagher . . .	273	26	51·7	22·3	6 months
,, . . .	482	28·6	42·3	29·1	1 year
,, . . .	404	21·5	41·6	36·9	2 years
,, . . .	286	25·2	32·9	41·9	3 years
,, . . .	152	23·7	29·6	46·7	4 and 5 years

Bahr followed 100 patients year by year and found that up to four years after treatment there is little change in the numbers still discharged, i.e. these patients remained well. On the other hand, the numbers of the original 100 who were dead at the end of each year up to four years increased, the deaths being drawn from the group of unimproved cases (Table I). Table II confirms these results, as Nicole and his co-workers found that up to four to six years after treatment the percentage of discharges remained approximately constant. As with Bahr's cases, the cases remaining in

hospital decreased. Table III shows results both in Reid's cases and in Meagher's collected series. After about six years after malarial therapy there is a marked fall in those still discharged, this being seen in both Nicole and Fitzgerald's series (Table II) and in that of Reid's (Table III). Concurrently, those still in hospital decrease greatly in numbers and according to Reid's results the deaths greatly increase.

The failure of so great a proportion, about 70-75 per cent. of paralytics, to undergo good remissions after treatment has led many writers to endeavour to determine the most favourable types of case for treatment.

Sex.—There is little or no difference between the benefits conferred by malarial therapy in the two sexes, although Hinsie and Blalock found that females lived longer than males.

Age.—The influence of age appears to be somewhat indefinite. Although Nicol in a series of 200 cases and Caldwell, who collected 579 cases treated in the London County Mental Hospitals, found that the age of the patient was not related to the treatment, Ferraro and Jong stated that the older the patient the less is the probability of improvement. The present writer found that from two to five years after treatment of 32 patients aged 21–40 years, 43·8 per cent. were discharged and 31·2 per cent. were dead ; of 36 aged from 41–50 years, 36·1 per cent. were discharged and 41·6 per cent. dead ; whilst of 20 cases aged 51–65, 20 per cent. were discharged and 75 per cent. were dead. Reid, in a study of 225 cases, reports that the average age of the patients at home was 41 years, whereas the average age of those still in hospital was 46 years and of those dead 45 years.

Primary Sore.—Caldwell found that the length of time from the appearance of the primary syphilitic sore to the malaria bears no relation to the results of the treatment. Dattner states that more favourable results are obtained in those whose syphilis has not been treated than in those to whom treatment has been given.

Duration of General Paralysis.—This bears a definite relation to the prognosis. Thus Marino found that his complete remissions occurred in patients in whom the duration of the general paralysis was from 14 days to two and a half years, whilst the incomplete remissions showed durations of from five months to three years. Caldwell reported that the discharged cases gave an average duration of 8·6 months (varying from 0·5 to 62 months), the improved of 12·7 months (from 1 to 108 months), the unimproved of 19 months (from 0·5 to 156 months) and those who died of 14·7 months (from 0·5 to 132 months). Reid found that the patients discharged showed an average duration of seven months, those still in hospital of 14 months and those dead of 12 months.

Table IV shows results obtained by two authors. The table shows that although the percentage of good improvements is less and the deaths are more amongst the cases with the longer history, remissions may occur with any duration of the disease, so that the treatment should be given to all

cases, however great the duration of the disease before treatment is commenced.

TABLE IV

Duration of General Paralysis

Author	Duration	Number treated	Remissions	Discharged	Dead
	Months		Per cent.	Per cent.	Per cent.
Nicol . .	up to 6	83	50·6	—	—
,, . .	12	51	35·3	—	—
,, . .	18	18	16·65	—	—
,, . .	24	6	0	—	—
,, . .	36	10	20	—	—
,, . .	over 36	6	0	—	—
Rudolf . .	up to 6	25	—	64	24
,, . .	7–18	22	—	40·9	40·9
,, . .	19–168	18	—	11·1	55·5

Types of General Paralysis.—The majority of writers have found that the expansive type of general paralysis has a good prognosis. Thus although Ferraro and Jong state that but 29 per cent. of these cases remitted, Bunker and Kirby report 67 per cent., Flick 62·5 per cent., and Nicol 55·25 per cent. of 47 cases, McIntyre and McIntyre report 55 per cent. of 20 cases, Rudolf 44·7 per cent. and Caldwell 40·3 per cent. of 215 cases. Hinsie and Blalock also give this type as that with the best prognosis.

Manic types are stated to show the best results by Pilcz and by Bunker and Kirby (67 per cent. of cases). Nicol reports 47·8 per cent. of remissions in 23 of this type, Ferraro and Jong 41 per cent., Caldwell 38·4 per cent. in 55 cases. Hinsie and Blalock also found that a large number of cases of this type improve. Of the depressed cases, Ferraro and Jong report that 66 per cent. improve, Nicol 48·25 per cent. of 29 cases, Caldwell 15·7 per cent. of 106 cases. Of the cases of simple dementia, best results were obtained by Nicol, who discharged 25·35 per cent. of 75 cases, by Caldwell 15·7 per cent., by Bunker and Kirby 12 per cent., and by McIntyre and McIntyre also 12 per cent. (in 56 cases). Pilcz reports good results with this type. Of the stuporose and confused types, Caldwell reports 23·1 per cent. discharges amongst 45 cases and Rudolf 13·6 per cent. discharges amongst 22 cases. Pilcz and also Hinsie and Blalock obtained poor results.

The differences found by the various writers are, no doubt, due to some extent to the possibility of classifying the same case in more than one group.

Physical Condition.—Of 22 cases reported elsewhere as being in 'good' or 'fairly good' physical condition at commencement of treatment, 54·24 per cent. were discharged and 18·2 per cent. had died. Of 26 cases in moderate physical condition, 34·6 per cent. were discharged and the same proportion died, and of 39 cases in 'poor' or 'very poor' condition only

23 per cent. were discharged and 76·9 per cent. had died from two to five years after treatment.

Wassermann Reaction.—The present writer found that of 63 cases who gave a + 40 + or + 40 (Mann and Partner technique) positive reaction in the cerebrospinal fluid, 41·3 per cent. were discharged. Of 14 who gave a + 20 + or a + 20 reaction, 28·6 per cent. were discharged, whereas of 10 giving a + 8 +, + 8 or + 4 reaction only 10 per cent. were discharged.

Condition after Discharge.—Investigations have been made with regard to the re-establishment of discharged cases. Meagher reports that of 404 cases discharged from mental hospitals, one-third were fully re-established, in one-third the disease was arrested, whilst in the remaining one-third the process was retarded only.

Caldwell found that of 101 patients from six months to five years after discharge, 73 per cent. were working. One man was engaged on building and assembling engines for the Schneider Trophy competition, one was a solicitor's clerk, and one, who was on the staff of a newspaper, had been promoted since his discharge. The present writer reported the case of a patient who since discharge from Claybury Mental Hospital had been working as an accountant for two and a half years. Reid reports that amongst his patients treated from one to five years previously 16 per cent. were at work and 8 per cent. able to work ; of those treated from six to nine years previously 6 per cent. were at work and 5 per cent. able to work. One patient, since discharge, had been promoted to a position with 20 men under his orders. Another had worked as an engine-driver for three years.

Meagher found that many of the discharged patients were unduly irritable and readily provoked in an argument, others tired more easily than before their illness. Where married life had been resumed, many of the recovered patients became parents.

Tabes.—Costa, Moura and Pires found that optic atrophy was arrested by malaria in tabes. Incontinence was modified and vertigo passed off.

Cerebrospinal Syphilis.—Three years after treatment, 18 (69·2 per cent.) of 26 cases of cerebrospinal syphilis were improved and in good condition (Neustadter).

Schizophrenia.—Yakubovsky obtained remissions in 30 per cent. of cases. Although this author advises that only early cases be treated, one patient was able to leave the hospital with a history of schizophrenia of four and a half years. Nineteen cases were treated by Belleri. Favourable results were obtained in six (31·58 per cent.) of which five were hebephrenic and the sixth catatonic in nature.

No satisfactory results were obtained in 19 chronic cases treated by Wizel and Markuszewicz, but remissions persisting for several months were obtained in intermittent types. In four acute cases, successful results are reported.

Levi-Bianchini and Nardi treated 476 cases of non-syphilitic psychosis

with malaria. Of schizophrenics 8 per cent. were cured and 16 per cent. improved.

Manic-depressive Psychosis.—Levi-Bianchini and Nardi obtained 23 per cent. of cures and 20 per cent. of improvements by means of malaria therapy.

In a group of acute and chronic post-infective, arteriosclerotic and endogenous psychoses about 10 per cent. good results were obtained.

Oligophrenia.—Malaria is of no value for this condition (Levi-Bianchini and Nardi).

Epilepsy.—Ramsay treated six cases of idiopathic epilepsy. In four cases, a temporary reduction of fits occurred, followed by an increase. One patient showed a permanent reduction of fits, and one a cessation, but death occurred one month after the malaria. Levi-Bianchini and Nardi state that malarial therapy is of no value in epilepsy.

MENTAL CHANGES

The hallucinations which may be associated or follow malarial therapy are apparently more common in men than in women. Kihn observed 28 cases of hallucinosis following the treatment, none of which were in women. Nicol observed the condition in only 2 per cent. of 200 females treated. The present writer had previously reported the condition in 22·5 per cent. of 40 male cases and Leroy and Médakovitch found the condition in 10 per cent. of cases. Masquin and Borel state that fluctuating hallucinations of all the senses are relatively frequent, auditory being more common than visual. The hallucinations may persist for a very short period only and special observation is required in order not to miss their fleeting presence.

Masquin and Borel state that hallucinations occurring during the febrile period tend to clear up, and Leroy and Médakovitch found that most of the hallucinated cases recovered. Kihn did not see a favourable outcome in any of his 28 cases and Wagner-Jauregg (cited by Meagher) considers the presence of hallucinations so unfavourable that the malaria should be terminated.

The paraphrenic states or the late psychoses occurring after treatment have been discussed by Masquin and Borel. These authors describe these conditions as confusional, hallucinatory, systematized, stuporose, with ideas of reference, manic-depressive, hypochondriacal, depressive and catatonic. With regard to schizoid reactions, four cases of hebephrenia and one of catatonia developed in Nicol's series of 200 females. A typical dementia præcox reaction was found by Ferraro and Jong in four cases out of 120 treated.

An improvement in power to form moral judgments was found by Weisfeld in 45 per cent. of 29 cases treated. In 56 per cent. improvement in attention developed and improvement in manual speed in 61 per cent. Tests were also used for memory, impressionability, the mental horizon and imaginative power, calculation, intellectual activity, intelligence and handwriting. In these tests 68–78 per cent. of the 29 patients improved after

treatment. Claude and Masquin have produced a series of tests for estimating the degree of intellectual recuperation of general paralytics.

PHYSICAL CHANGES

Nicol records that of the discharged cases in his series of 200 treated cases, nearly all showed an increase in weight of from a few pounds to 1 stone. Those patients who developed partial remissions showed greater gains, of from 2 to 3 stone, whilst those remaining in hospital with marked mental reduction, increases of from 2 stone to 6 stone occurred. On the other hand, Cheney and Warner, in 33 patients, found that those who improved mentally showed an average gain of 4 lb., whereas those who gave no mental improvement gained about ½ lb. each.

Reflexes do not show much improvement, and in unimproved cases are frequently worse, although coordination, ataxia, tremors and speech were all favourably influenced in the improved cases (Ferraro and Jong).

Reid, examining his treated patients, found that all patients remaining in hospital showed pupillary changes, 60 per cent. exhibiting unequal pupils with lack of contraction to light. Of the cases discharged to their homes, 87 per cent. showed pupillary changes. Approximately the same proportions of patients still in hospital and of those discharged to their homes showed slurring of speech, absent kneejerks and extensor plantar responses.

PATHOLOGICAL CHANGES

The changes in the cerebrospinal fluid accompanying malarial therapy have been divided into four periods by Käfer. The first period is during the malaria in which there is attenuation of the fluid pressure. The second period, named primary post-malarian period, extends up to one year from the termination of the fever and shows a reduction of the pleocytosis. This reduction is continued and extended in the third or secondary post-malarian period which lasts until the end of the second year. During the fourth, or later, period the reactions may become normal.

According to Ferraro and Jong a close correlation between the serological and clinical improvements sets in within 35 months of treatment. Within two to three years after treatment these authors found that 86 per cent. of cases gave a negative Wassermann reaction in the blood and 68 per cent. a negative in the cerebrospinal fluid.

Of cases examined from 6 to 24 months after treatment with malaria only, two (18·2 per cent.) of 11 discharged cases gave negative reactions in the serum and the same number in the cerebrospinal fluid. Of 12 cases who improved, one (8·3 per cent.) gave a negative Wassermann reaction in the serum and two (16·6 per cent.) in the fluid. Of 40 unimproved cases seven (17·5 per cent.) gave a negative reaction in the blood and three (7·5 per cent.) in the fluid (Bahr and Bruetsch). Bunker found that in 47 cases examined at least two years after treatment, the Wassermann reaction in the cerebro-

spinal fluid was negative in 21 per cent., improved in 38 per cent. and showed little or no change in 40 per cent. of cases. Caldwell reporting on cases from three to eight years after treatment found a higher percentage of improvements in the Wassermann reactions in the cerebrospinal fluid, but not in the serum, in those cases treated with malaria who showed the greater mental improvement. Of 44 cases showing a good or very good mental change, 11 (25 per cent.) gave a negative Wassermann reaction in the serum, and of 49 showing a moderate or poor mental result 13 (26·5 per cent.) gave a negative reaction. In the cerebrospinal fluid, of 34 cases in the first group, seven (20·6 per cent.) gave a negative reaction, and of 44 cases giving a moderate or poor mental result, only three (6·8 per cent.) showed negative reactions after treatment.

In cases treated with malaria and arsenic, the same writer reports that in 22 patients showing good or very good mental changes, seven (31·8 per cent.) gave negative reactions in the serum and of 20 showing moderate or poor mental results, four (20 per cent.) showed negative reactions. Of 20 cases in the first group, five (25 per cent.) gave negative results in the cerebrospinal fluid, and of 18 cases in the second group, one (5·55 per cent.) gave such a reaction.

Tennent reported on cases examined over two years after treatment with tryparsamide and pyrexia (all treated with malaria, except two with relapsing fever). Of 27 cases, 10 (37 per cent.) gave a negative reaction in the serum, and eight (29·6 per cent.) in the cerebrospinal fluid.

A study of 350 cases year by year has been made by Nicole and Fitzgerald. These cases before treatment gave 99·2 per cent. positive reactions in the serum and 97·5 per cent. in the spinal fluid. Summarizing the results, of 227 cases up to three years after treatment 80·6 per cent. gave positive reactions in the serum, and 90·26 per cent. in the fluid. From three to seven years after treatment the figures for 86 cases were 56·65 per cent. and 32·8 per cent. respectively. Finally, from seven to nine years after treatment the figures for 21 cases were 41·5 per cent. and 27·85 per cent.

Cell Counts.—As the years pass after treatment the percentage of cases showing reduced cell counts in the spinal fluid increases. In 350 cases reported by Nicole and Fitzgerald, 92 per cent. showed an increase of cells before treatment. Of 227 cases up to three years after treatment in 38·53 per cent. the increase persisted. Of 52 cases from three to five years after treatment 13·95 per cent. showed an increase, but in 55 cases from five to nine years after treatment only 7·75 per cent. showed such increases.

Protein of Spinal Fluid and Serum.—Nicole and Fitzgerald also deal with globulin changes. In their series, 96 per cent. showed positive reactions before malaria. Of 279 cases up to five years after treatment 64·15 per cent. gave positive results; of 34 cases from five to seven years after, 38·5 per cent.; and of 21 cases from seven to nine years, 9·55 per cent. gave positive reactions. Again, the progressive nature of the fluid changes is emphasized.

Tennent gives the protein in mgm. per cent. before and after treatment with tryparsamide and fever. In 25 cases in a series of 26, the protein was reduced in cases examined at least two years after treatment.

Immediately after malaria, the total serum protein shows no change, but the serum albumen falls. Ogden shows a fall of the average from 4·59 per cent. in 12 untreated cases to 4·14 per cent. in 12 treated cases with maxima and minima of 5·68 per cent. and 3·66 per cent. in the untreated paralytics and of 4·69 per cent. and 2·90 per cent. in the treated.

On the other hand, this worker found that the serum globulin average rose from 2·38 per cent. in the untreated cases to 2·66 per cent. in the treated, the maxima and minima being 3·25 per cent. and 1·75 per cent. in the untreated and 3·58 per cent. and 1·80 per cent. in the treated. The average percentage of globulin in the total serum protein was 33·4 in the untreated and 38·8 in the treated paralytics.

Bunker reports that immediately after malaria, the total protein in the spinal fluid averaged 156 mgm. per 100 c.cm. (16 cases), whereas before treatment the average was 192 mgm. One month after treatment, the figure was 124 mgm. (13 cases) and after three months it was 91 mgm. (10 cases). Two years after treatment 42 per cent. of 38 patients gave a reading of 50 mgm., 29 per cent. of from 50 to 75 mgm., and 21 per cent. a high average reading of 85 mgm.

Lange Reaction.—Before malaria, Nicole and Fitzgerald recorded that 92·9 per cent. of 350 cases showed a Lange reaction reaching up to 4 or 5. For each year after treatment the percentage falls as follows: 79·3, 67·6, 50·0, 31·2, 30·0, 12·5, 0, 0, 0.

In 25 cases treated by Tennent with tryparsamide and fever and examined at least two years after treatment, 11 (44 per cent.) showed negative Lange reactions, three (12 per cent.) reached up to 2 or 3, and 11 (44 per cent.) reached 4 or 5 units.

Boltz Acetic-anhydride Tests.—In 176 fluids from untreated paralytics, Nicole and Fitzgerald found that 18·75 per cent. gave negative reactions. In 123 fluids examined within three years of the first course of malaria, 48·78 per cent. were negative and in 57 fluids tested over three years after malaria 89·12 per cent. gave negative results. The same authors report that shortly after malaria, the test may be positive although it has been negative before the treatment.

Flocculation Tests.—Nicole and Fitzgerald in their series of 350 cases found that there was no change in the percentage of positive results of flocculation tests in the serum even up to nine years after the initial malarial therapy. On the other hand, in the spinal fluid from seven to eight years after malaria the percentage of positive results fell progressively from 97·5 per cent. to 52·25 per cent.

Permeability for Bromide.—Malamud and Wilson found that, in a series of 54 cases of untreated general paralysis, there was an increased permeability

(index below 2·8). After cessation of malaria, there may be a further increase, followed by a fall in cases that subsequently show clinical improvement, the index rising to the normal of from 2·8 to 3·2. This fall does not occur in cases that show no clinical improvement. The authors found a relationship between the index and the quantity of iron in the cerebral vessels.

HISTOPATHOLOGY

Thorough investigations of the brains of cases dying during or after therapeutic malaria have been made by Geary and also by Wilson. During treatment, the lymphocytes are numerous in the meninges and the macrophages increase shortly after the termination of the fever. Infiltration of the vessels is very intense. Wilson found in 16 cases that within six weeks after treatment the changes are those of a severe diffuse general paralytic process. There is a strong glial proliferation with an increase of iron in the bloodvessel wall and the microglia. Numerous macrophages are present in the meninges.

From six weeks to two and a half years after treatment in 13 cases, a gradual improvement in the arrangement of the cortical layers and nerve cells was observed. Considerable reductions of infiltration, of glial proliferation, of iron in the vessels and of microglia occurred. During the latter part of the period, from one to two and a half years after treatment, secondary increases of macrophages in the meninges, of iron in the vessels and of microglia were found.

Six cases, dying from six months to two and a half years after treatment, showed scattered foci of intense inflammation with marked proliferation of the mesodermal tissue and with typical miliary gummata in one patient. In five of these cases spirochætes were found and no improvement appeared in the serological reactions.

Wilson defines three periods. The first is a period of exacerbation of all changes, commencing during treatment and persisting up to six weeks after treatment. The second is a period of restoration, which may continue for years; whilst the third, occurring any time after six months, is the period of recrudescence, with a flare-up of the histological process. Of six cases which developed convulsive attacks after the malaria four showed well-marked changes of the paretic type, but in only one case were spirochætes found. Of a total of 29 cases in the periods of exacerbation and restoration, spirochætes were found only once.

Geary found that 10 cases out of 16 treated from three months to two and a half years previously showed definite improvement pathologically. Two cases treated 15 months previously showed no vascular lesions. Spirochætes were found in one case only, a congenital general paralytic, in place of the 60 per cent. of untreated cases in which these organisms are seen.

Kopeloff and Blackman found spirochætes, chiefly degenerate in type, in six out of 39 cases treated with malaria. These organisms were found in eight out of 10 untreated paralytics.

Bruetsch points out that the histiocytes are very numerous in the perivascular spaces of the large vessels in the white matter, in the striatum and pons. The immediate response to the malaria is an activation of the reticuloendothelial apparatus, giving rise to the formation of macrophage tissue.

MODE OF ACTION

The most important contributions to this problem have been those of Eddison and of Power. Eddison finds that the leucopoietic functions are improved, the leucocyte reserve diminished and the leucocytes reduced in number in general paralysis. The reticuloendothelial system is flagging under the influence of chronic syphilis. Pyretotherapy stimulates this flagging system. Power believes that the reticuloendothelial system is stimulated, first, because malaria affects this system markedly; secondly, because there is a tendency to obesity after the treatment; and, thirdly, because there is an intimate relation between the system and the hæmatopoietic structures.

New formation of phagocytic tissue and stimulation of the endothelium, with reductions of the increased permeability of the brain capillaries, are thought by Bahr to be important contributing causes of the improvement.

The degree of pyrexia does not appear to be related to the clinical improvement, but Ferraro and Jong found a parallelism between the number of febrile paroxysms and the serological improvement.

Immunity.—Little new has been discovered with regard to immunity. James has shown that patients immune to one species of plasmodium are not immune to another. It was known earlier that patients immune to one strain of P. vivax are not necessarily immune to another strain of the same species. Ciuca found that of patients whose primary attack of malaria was terminated by quinine, 32 per cent. could be given a second course of malaria, but of those whose primary attacks had been allowed to run to spontaneous recovery, only 15 per cent. could be reinfected.

TREATMENT

Inoculation.—Cases should not be inoculated with blood from a patient suffering from splenic suppuration. Bahr and Bruetsch record such an inoculation with fatal results three and a half months later. The necropsy showed endocarditis of the mitral valve, a hæmorrhagic splenic infarct and minute embolic areas of softening in the left temporosphenoidal lobe. No doubt the presence of any suppurative process should negative the removal of blood for purposes of inoculation.

James has described further details relating to mosquito inoculation and has successfully used malignant tertian malaria. This worker found that the death-rate amongst the mosquitoes is high. Of 18,315 insects

(A. maculipennis) used in 84 batches, only 5,862 lived sufficiently long to be available for infecting patients. The transmission of quartan malaria by mosquito is difficult, firstly, because there are but few patients who are infective to mosquitoes, and, secondly, because infected insects seldom infect people. James was unable to infect any persons with quartan fever from infected mosquitoes. Similar difficulties were met with regard to malignant tertian malaria. In 22 feeding experiments only one 'good infector' of mosquitoes was found.

The quality of the gametocytes is of more importance than their quantity. James now compares the infectivity of different cases on the basis of exflagellating male forms in the films made from moist chamber preparations of the patient's blood. With P. vivax, A. maculipennis is consistently negative when there is less than one exflagellating male to every 1,000 leucocytes in a film kept at 25° C. for 15 minutes.

Reinoculation with malaria after failure to improve clinically does not, according to Nicol, appear to be very beneficial. Of 61 cases reinfected, very few improved physically and four were discharged, but all of the latter had commenced to improve before the second inoculation was performed. Reid found that of 32 patients reinoculated three were able to be discharged after the second course of malaria. Horn found that relapses of the syphilitic process occur only in patients with persistent abnormal cerebrospinal fluids. If the fluid is still positive a year after treatment, a second course of malaria should be given, which, Horn states, will often cause a rapid disappearance of the abnormal serological reactions.

Incubation Period.—A detailed study of the length of the incubation period has been made by James. He found that in mosquito-inoculated cases the mean duration in days of the period in primary attacks was $14{\cdot}102 \pm 0{\cdot}077$ and in subsequent attacks $18{\cdot}12 \pm 0{\cdot}55$. With blood inoculation the periods were $11{\cdot}205 \pm 0{\cdot}214$ and $18{\cdot}7 \pm 0{\cdot}455$. In 746 primary cases inoculated from mosquitoes the correlation-coefficient of the number of bites and the length of the period was $-0{\cdot}157 \pm 0{\cdot}025$. When the bites were less than six in number, the incubation period was slightly longer than the average, and when more than six, there was a tendency for it to be shorter than the average. The period tended to be shorter from April to October and in excess of the average during the winter months. Latent infections have been reported by James and by Swellengrebel de Buch and Swellengrebel de Graaf. Periods of from 32 weeks three days to 45 weeks two days between mosquito-inoculation and the onset of malaria have been recorded by these observers. The number of bites varied from one to eight per patient.

Marino, inoculating subcutaneously with blood, obtained one incubation period of 43 days.

The length of the period between inoculation and the first typical malarial attack was found by Assendelft in 350 cases to vary with the number

of P. vivax injected. When from 15,000 to 1,000,000 were used, the period averaged 14·2 days; from one to 10 million, 12 days, and from 10 to 100 million, 10·7 days.

Temperature Chart.—The rise of temperature occurring as a reaction to the injection of the blood has been studied by Assendelft in 170 cases inoculated subcutaneously with P. vivax. In eight cases a rise of temperature occurred upon the day of injection, in 29 upon the following day, in 27 cases on the second day, and in eight cases upon the third day after the inoculation. In 13 cases this pyrexia rose to over 39° C. (102·2° F.). The pyrexia was apparently related to the number of parasites injected, as no case of injection fever occurred when less than one million parasites were used, but 40 per cent. of cases showed the fever when from one to 10 million were injected, and nearly 80 per cent. when more than 10 million were utilized. When the incubation period was under 11 days, 60 per cent. showed injection fever, and when over this period, 'a good' 20 per cent. With intravenous injection, the pyrexia occurred in about 10 per cent. of cases.

The degree of pyrexia was not found to be related to the therapeutic result by Nicol, and Caldwell was unable to come to definite conclusions with regard to the duration of the fever. These results are not unexpected, as many patients show very slight clinical improvements during the incubation period and some patients undergo remissions without developing pyrexia or show a rise of temperature of a slight degree only. Bahr records a case in which parasites were found after inoculation but no fever occurred. Within three years the Wassermann reactions in the blood and cerebrospinal fluid had become negative, the globulin negative, the cells reduced and the Lange, from a paretic curve, had become 0012110000.

Clinical Condition.—Pires and Póvoa believe that the action of malaria is sometimes irritative and is thus the explanation of the secondary cutaneous manifestations sometimes found during malaria therapy.

The Blood.—In the earlier febrile paroxysms plasma-cells have been found in the blood of paralytics undergoing malarial therapy (Hattori). Saunders states that the 'shift to the left' in untreated general paralysis is corrected in 6 to 12 months by therapeutic malaria. Alberto found that the myelocytes may increase up to 15 per cent. in the early febrile attacks, but that they disappear completely by about the fifth paroxysm.

The Parasite.—Plasmodium ovale has been used by Nicol. This species and also P. malariæ (quartan malaria) are suitable for the treatment of debilitated cases, as both are milder than fever produced by P. vivax (benign tertian malaria) or P. falciparum (malignant tertian malaria). The marked prostration at the cessation of a course of benign tertian malaria is rare at the end of a course of quartan fever.

With P. ovale, Nicol reports that the parasites are few and that both the pyrexia and the parasites may spontaneously die out before the patient has undergone an adequate course.

Kirschbaum treated with quartan malaria 16 cases during the year of onset of the paralysis and obtained 68·7 per cent. good remissions.

Termination of Fever.—Cases have been recorded in which improvement has occurred after inoculation with malaria although little or no pyrexia has developed. Bahr reports one case, inoculated in July, 1926, in which parasites were found but which showed no pyrexia on a four-hourly chart. No mental improvement was observed, but a definite physical improvement took place. By March, 1929, the Wassermann reactions in the blood and fluid had become negative as had also the globulin. The cells in the fluid had improved from 13 to 1·5 per c.mm. and the colloidal gold curve from 5431100000 to 0012110000. In the second case reported by the same worker, the inoculation was performed intravenously in December, 1925. During an observation period of five weeks with a four-hourly temperature record no pyrexia occurred. The patient was reinoculated on January 11, 1926. On January 12 and 13 rises of temperature to 101·5° F. and 103° F. occurred. Inoculations were again carried out on March 4, 19 and 27, but no rise of temperature developed. The malaria was checked by quinine from April 16, 1926. The patient improved mentally in a striking manner and was able to leave the hospital. For several years he has now carried out his duties satisfactorily at his former employment as a porter.

Another case has been reported by F. H. Stewart. This patient was inoculated in December, 1924, five years after the onset of slightly grandiose ideas. For about three weeks parasites were present, but no fever developed. By November an apparent complete remission had set in and the patient was discharged. Two years later, the patient was still in regular employment (potter's artizan) in which he had been since his discharge.

F. H. Stewart advises treatment by a so-called 'apyrexial' method. Although Grant and Silverston believe that from five to 10 febrile paroxysms are sufficient in place of the usual eight to 12, F. H. Stewart has used less. The malaria is terminated after the first, second or third rigor. One to three months later, the patient is reinoculated and the same procedure followed. If the improvement is insufficient for discharge further courses, up to four, have been given. Two series of unselected cases, except those moribund, were treated with the following results.

TABLE V

Short (Apyrexial) and Usual Methods (F. H. Stewart)

	Twelve rigors	Short or apyrexial
Number	26	19
Greatly improved . . .	23 per cent.	42·1 per cent.
Improved	11 ,, ,,	26·3 ,, ,,
Unimproved	65·3 ,, ,,	31·5 ,, ,,

F. H. Stewart draws attention to the slight improvements of the paralytic that may occur during the incubation period of the malaria as recorded elsewhere (*Therapeutic Malaria*, 1927). He believes that the short or apyrexial method of treatment is more advantageous as there is a reduction of mortality and suffering and as there is no prostration after drawn-out fever. He believes that malaria should be used in the same way as a vaccine by repeated well-spaced doses adjusted to produce a gradual progressive cure.

Of cases inoculated with benign tertian malaria by means of mosquitoes, Nicol reports that about 50 per cent. relapse on one or two occasions. These relapses of malaria have been divided by James into :—

(*a*) Recrudescence : a return of parasites and fever up to eight weeks after the primary attack.

(*b*) Relapse : as a recrudescence but occurring between eight and 24 weeks after the primary attack.

(*c*) Recurrence : as a relapse but occurring later than 24 weeks after recovery from the primary attack.

Nicol states that these relapses, although giving a second series of febrile paroxysms to the patient, are of no benefit, the result being no better with mosquito-inoculation than with blood-inoculation, in which relapses are rare.

Accessory Treatment.—The importance of attending to the patient's general health before inoculation is rightly stressed by Nicol. This worker advises that septic foci should be dealt with. Johnson and Jefferson consider that, if any doubt exists with regard to the patient's physical condition, tryparsamide should be given before the commencement of the malaria. The urine should be examined and constipation corrected.

After the malaria, Nicol advises that Fellows' syrup be given. Leroy, Médakovitch and Prieur administered potassium iodide, mercuric biniodide, cyanide of mercury and sulfarsenol. In addition, sodium stovarsol alternating with quinby was given thrice weekly.

During the malaria, Nicol advises that the patient be kept in a warm blanket-bed and a hot drink given as soon as shivering commences. Gentian with soda may be valuable for nausea or vomiting.

DANGERS AND DEATHS

Figures now exist with regard to the number of deaths occurring in connexion with malaria used for therapeutic purposes.

Of 165 deaths, Caldwell found that 49·4 per cent. occurred within two months of the commencement of treatment, and of 541 deaths studied by Meagher, 40 per cent. were found to have occurred in the same period. Caldwell, reporting on 579 cases inoculated, found that 10·8 per cent. died in the first two months after inoculation. These figures are slightly higher than those for England and Wales. Meagher found, of 1,532 cases inoculated, 135 died within the first month and 74 in the second month, making a total of 7·3 per cent. in the first two months.

Nicol reports an even lower rate. Within two months, with benign tertian malaria, 5·3 per cent. of all cases treated died, and that with 52 cases treated with malignant tertian fever 4 per cent. died.

A list of complications to be faced is given by McIntyre and McIntyre. Of 42 patients inoculated, seven showed a tendency to pyogenic infections, two developed uræmic coma (could be forestalled by systematic estimation of urea nitrogen content of blood); three collapsed and one died from circulatory collapse, three died from acute bulbar palsy and one died in a paretic seizure.

Bahr and Bruetsch report the case of a splenic abscess which perforated into the lung. Quinine stopped the malaria, but 11 days later a malarial relapse developed and death took place. The abscess was found post mortem. Meanwhile another patient had been inoculated with blood from the first case. He died three and a half months later with mitral endocarditis, splenic hæmorrhagic infarcts, and minute areas of embolic softening of the left temporosphenoidal lobe. The authors suggest that some type of streptococcus was transferred to the second patient.

The presence of albuminuria, which should be looked for daily, necessitates the termination of the malaria, although the condition may be temporary only (Nicol).

With regard to the number of parasites, Nicol considers that the malaria should be terminated if more than one parasite is found in each field when a $\frac{1}{12}$-inch objective and no. 2 ocular are used. Twenty-five fields should be examined. According to Lépine, Bourrat, Christy and Larrive malaria is contraindicated if marked depression, wasting or nephritis be present.

None of these risks are, however, so great as are those for the untreated patient. Of 624 patients admitted to mental hospitals in England and Wales in 1923 who received no treatment, 89·8 per cent. had died by the end of 1927. Again, of 549 patients admitted during 1924, and also untreated, 83·2 per cent. had died by the end of 1927. On the other hand, of 152 patients treated with malaria in 1923, only 46·6 per cent. were dead at the end of 1927, and of 286 patients treated in 1924, but 42 per cent. had died by the end of 1927 (Meagher). The risks run by the untreated patient are therefore about twice those run by the patient who is treated with malaria.

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Short Notes and Clinical Cases

'CROWDING' OF EXCITATION AS THE IMMEDIATE CAUSE OF SOME EPILEPTIC FITS: A CONSIDERATION OF THE PATHOGENESIS OF EPILEPTIC FITS PRECIPITATED BY ANGER AND OF THOSE OCCURRING IN SITUATIONS OF DANGER

By

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Pavlov, working with dogs, has produced evidence tending to show that the cerebral cortex may be represented as a mosaic of constantly shifting areas of excitation and areas of inhibition, each opposing the irradiation of the other. Applying his observations to man, I have tried to show that the interplay of excitation and inhibition sometimes leads to phenomena interpretable as manifestations of the 'crowding' of either of these functional states into particular cerebral areas. A few examples will show what I mean.

'*Crowding*' *of Inhibition.*—In a recent paper [1] I have referred (p. 9) to five cases of narcolepsy, reported respectively by Kinnier Wilson, Cave and Rosenthal, in which the attempt to ward off an impending sleep attack sometimes led to an attack of powerlessness. (Later I came across the same observation in Case I of Wenderowic.[7]) This phenomenon may be understood in the light of Pavlov's view that sleep (an inhibitory state) results from the irradiation of inhibition over a sufficiently large part of the cortex. When a person is falling asleep, we may infer that inhibitory processes are irradiating over his substrate of consciousness. When he tries to resist sleep, a multitude of excitatory processes come into play, opposing the spread of the inhibitory processes. The latter, deflected, so to speak, from their original goal, will invade those areas where they meet with the least opposition. Thus, in the cases cited, they were evidently deflected from the substrate of consciousness to the motility substrate. This deflection reminds one of what happens in a football game, when the player rushing the ball is crowded by his opponents, as they advance upon him, into that part of the field where he sees the least opposition.

'*Crowding*' *of Excitation.*—From a number of examples cited in a recent paper [3] the following is chosen. MacCurdy has given an account of the

reaction of soldiers to their first bombardment. After remarking that the commonest reaction is fear, he said [5] (p. 17): 'A less common reaction is that of excitement, accompanied even with a kind of spurious elation. The man has a tendency to make facetious remarks about the shells, to laugh at feeble witticisms, and very often feels under considerable *motor tension, there being a pressing desire to do something, to do it immediately and do it hard*' (italics mine). I have suggested [3] (p. 346) that this motor tension may be regarded as a manifestation of crowding of excitation. The most basic (not the strongest) wish of the soldier is to run away to a spot where there are no shells. Let us, for the sake of convenience, speak of the nervous mechanism utilized in running away as the 'running substrate.' We may assume that when a soldier has the impulse to run away, there are, in the highest levels of his 'running substrate,' excitations which, figuratively speaking, clamour for expression.* Since he refrains from running away, we may assume that these excitations are opposed by stronger inhibitions. The excitations cannot vanish into nothingness; they are merely crowded away from the 'running substrate' into other parts of the motility substrate. Their persisting in the motility substrate may be inferred from the fact that the soldier is aware of motor tension and of 'a pressing desire to do something, to do it immediately and do it hard.'

Whenever an impulse to action is suppressed, one may reasonably suppose that excitation is crowded away from the substrate of the act in question and is diverted into the remaining part of the motility substrate; there is, in consequence, apt to be an increase in the 'tension' † of this remaining part. When the suppressed impulse is strong, the increase in tension in the remainder of the motility substrate may be great. I now submit the question: Supposing a 'discharging lesion' to exist in some part of the motility substrate, may this increase in tension precipitate an epileptic fit?

This question may, I think, be answered affirmatively. In illustration I refer to those cases in which epileptic fits are precipitated by anger. In considering the pathogenesis of fits thus precipitated, it must be remembered that anger is usually, if not always, accompanied by aggressive impulses aimed at the person or object which has provoked it, and (what is very important) these impulses often must be suppressed. In these cases I suggest that it is not justifiable to say with certainty that the patient's discharging

* This assumption is in accord with Hughlings Jackson's views on the central processes correlative with movement. In a recent paper [4] I have presented those of his views which bear on the present discussion.

† 'Tension' is here used figuratively. In its literal sense, tension describes a state of muscular, not nervous, tissue. It should be emphasized that the suppression of an impulse does not always lead to an increase in the tension of the motility substrate. The excitation concomitant with the impulse is opposed by inhibition; the motility substrate, if unduly inhibitable, may succumb to this inhibition, the result being a cataplectic attack—a state in which there is *absence* of tension in the motility substrate.

lesion is set off by anger. It is possible that the decisive factor is not anger, but the suppression of powerful aggressive impulses. Concomitant with this suppression, excitation is crowded away from the substrate of a particular act (the aggressive act which would have appeased the angry man); there may be, in consequence, a 'piling up' of excitation in the remaining part of the motility substrate, and an increase in tension in this remaining part; it may be this increase in tension that causes the discharging lesion to go off.

An instructive illustration of the cases under discussion was reported by Marsh.[6] The patient, a soldier, had an epileptic fit (it happened to be his first) under circumstances about to be described. He was 'an excellent soldier of the infantry, an Armenian with our army, who had difficulties with the first sergeant of his company. The sergeant, of German parentage, possessed many racial characteristics. Although a fine specimen of physical manhood and an excellent American soldier, his very appearance was odious to the Armenian, who had lost his wife and children in the massacres of his native land. Because of these differences, the Armenian was detailed to the officers' mess for duty, where he would be less apt to come in contact with the first sergeant. Some time later, however, their quarrel was renewed, when the first sergeant, in language which betrayed not a long separation from that of the Fatherland, proceeded to give the Armenian a lecture on proper respect to the first sergeant of the company. Angered to the breaking-point, the Armenian would have crushed him had he dared to violate the laws of military discipline; but, inhibited, he faced his aggressor until in emotional exhaustion he fell unconscious, and the emotion went on to an abnormal expression in a typical grand mal attack.'

We now pass to another type of case, different in detail but similar in principle to the foregoing. I refer to those cases in which epileptic attacks occur in dangerous situations. I suggest that the occurrence of a fit in a dangerous situation is probably not always a mere coincidence; conceivably it may sometimes result from suppression of the impulse to escape the danger. To take an example, let us consider the case of an epileptic who has a fit while working on a scaffold. Knowing of his malady, he cannot but feel uneasy while on the scaffold, and must have a strong impulse to return to safety. Suppressing this impulse means that there is crowding of excitation from certain motor areas, a 'piling up' of excitation and an increase in 'tension' in the remainder of the motility substrate, which in turn may cause the discharging lesion to go off.

Generalizing from these and similar instances, I suggest that when an epileptic fit supervenes on the suppression of a strong impulse, we may hypothesize the following sequence of events as a possible explanation of the fit: (1) Excitation is crowded away from the substrate of the act the impulse to which is being suppressed; (2) there is a 'piling up' of excitation, hence an increase in 'tension' in the remainder of the motility substrate; (3) as a direct result of this increase in tension, the discharging lesion goes off.

I do not believe that crowding of excitation can *of itself* account for a fit. I adhere to Hughlings Jackson's view that without a discharging lesion there can be no epilepsy.

The cases of epilepsy discussed in this article may be contrasted with two groups of cases. (1) They may be contrasted with those cases of narcolepsy alluded to in the second paragraph of this article, in which the attempt to ward off an impending sleep attack led to an attack of powerlessness. Viewing these cases of narcolepsy, we may say they are cases in which there is undue *inhibitability* of parts of the brain, and in which some of these parts succumb to *inhibition* in consequence of crowding of *inhibition*. By contrast, viewing the cases of epilepsy, we may say they are cases in which there is undue *excitability* or dischargeability of a part of the brain (a discharging lesion), and in which this part succumbs to *excitation* (producing a fit) in consequence of crowding of *excitation*. These two groups therefore are, in Jackson's term, corresponding opposites. (2) They may be contrasted with those cases in which cataplexy supervenes on the attempt to suppress a strong impulse. Thus, while in some cases an epileptic fit occurs when the patient is made angry (there being suppression of the impulse to aggressive movement), in others these circumstances provoke an attack of cataplexy.[4] Again, while in some cases an epileptic fit occurs when the patient is in a position of peril (there being suppression of the impulse to escape to safety), in others these circumstances provoke an attack of cataplexy. (Several such cases, reported by Hilpert, Spiller and Kinnier Wilson, are cited on p. 127 of my recent paper.[2]) The attempt to suppress an impulse means that there is a 'struggle' between excitation and inhibition. The symptoms that follow such an attempt may result either from the crowding of excitation into certain parts of the brain (as in the cases of epilepsy referred to) or from the overflow of inhibition into certain parts of the brain (as in the cases of narcolepsy referred to).

SUMMARY

Epileptic fits are sometimes provoked by anger, under circumstances necessitating the suppression of aggressive impulses, as in a case reported by Marsh, in which a fit occurred when the patient, a soldier, was goaded into impotent fury by an overbearing superior officer. In these cases it is not obligatory to ascribe the setting off of the discharging lesion to anger. It is possible that the decisive factor in causing the lesion to go off is not anger but the suppression of the aggressive impulses which accompany anger. During the effort to suppress these aggressive impulses there is 'crowding' of excitation from the substrate of certain aggressive movements into the remaining part of the motility substrate; this may lead to a 'piling up' of excitation, and consequently to an increase in 'tension' in this remaining part; this in turn, it seems possible, may cause the discharging lesion to go off.

The same conclusion applies to cases in which epileptic fits occur in

dangerous situations. Granting the possibility that some of these cases may represent a mere coincidence, we may, speaking of the remaining cases, say that the patient is aware of his danger, has an impulse to escape to safety, and (for any reason whatever) suppresses this impulse. There follows the sequence of events described in the preceding paragraph.

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Editorial

THE NOMENCLATURE OF INTRACRANIAL TUMOURS

TUMOURS of the brain are among the commoner afflictions with which the neurologist has to deal, but their frequency is scarcely realized either by the general practitioner or by the public. The death-rate of 1 in 400 from cerebral tumour given recently by the Registrar-General for England and Wales is a reflection of the opinion of the general practitioner, but there is reason to believe that deaths from primary intracranial neoplasm are at least four times as frequent as these statistics indicate. Thus Weil, in his recent book, quotes statistics gleaned from the post-mortem records of large general hospitals in Vienna and Heidelberg. In the former, during the period 1855–78, primary brain tumours were found in 1·14 per cent. of all post-mortem examinations, and in the latter during the period 1854–1931 in 1·39 per cent. Similar statistics have also been published from England and America, primary cerebral tumours being found in 1·1 per cent. of 13,000 autopsies at the Leeds General Infirmary (Garland and Armitage), and in 1 per cent. of 6,000 autopsies at the Los Angeles Hospital (Courville). These were all hospitals where no special claim was made for the diagnosis and treatment of diseases of the nervous system, and the remarkable accord of the statistics is strong evidence of their veracity.

These statistics explain the increase of interest in cerebral tumours which has taken place during the last few years. While this interest has added something to our knowledge, it has also added a multiplicity of new names coined by the whim or fancy of enthusiastic workers and retained more often in loyalty to their originator, or simply to avoid greater confusion, than for their scientific value. For much of this new terminology there is little if any justification. New names should either connote new ideas or be more appropriate than the old, but in the case of cerebral tumours the advances in knowledge have been few and these largely debatable, while many of the names are neither exact nor suitable.

As regards the most important group of cerebral tumours, that of the gliomas, there is general agreement that the classification of Bailey and Cushing has been of value. Their description for the first time of the oligodendrogliomas represents a distinct advance in knowledge, and for the rest their classification has stimulated research and interest. It has not, however, been immune from criticism. This was directed in the first place against the basis of classification as being too reminiscent of Cohnheim's 'cell-rest' theory. When the defence was made that the names given did not connote any ætiological theory but referred merely to the cell type, the attack was transferred to the names themselves. That of 'medulloblastoma' in particular has come under fire, since orthodox views on the development of the nervous system have no place for the 'medulloblast.' While American authors as a whole have accepted this name as a convenient designation of a characteristic form of tumour, others have rejected it on the ground that most of the tumours included under this name are neuroblastomas, the remainder being very malignant glioblastomas. Undoubtedly the term 'medulloblastoma' and the (French) alternative 'neurospongioma' are confessions of ignorance on the point whether the tumour cells are neuroblasts, glioblasts, or both, and while such terminology may have its uses it is apt to lead the uninitiated to think that the origin and nature of the tumour have been finally determined.

Ependymal tumours are also at present the subject of controversy. To the two types in Bailey and Cushing's classification, Roussy and Oberling add a third, the 'ependymoglioma,' whereas del Rio Hortega refuses to classify any tumours as of ependymal origin, naming tumours with similar histological character either 'glioblastoma isomorpho' or 'glioepithelioma.' Neither of these authors recognizes the polar spongioblastoma, and only one of them the astroblastoma as a distinct entity. Obviously there is need for much careful work before final classification of the gliomas is reached.

As regards the other forms of primary intracranial tumour, there is less disagreement as to essentials, but much still as to nomenclature. The term 'meningioma' is in many respects misleading. If under this name we may include all tumours growing from the meninges, it will include not only the well-known 'dural endotheliomas' and psammomas, but also myxomas, meningeal sarcomas and some melanomas. Bailey and Bucy add to this list lipomas and osteomas. Mallory

proposed the name ' meningeal fibroblastoma ' for the common solitary meningeal tumours, but it is clear that in spite of its tendency to form collagen this form of tumour arises from, and reproduces the structure of, the layer of special cells which covers the outer surface of the arachnoid, rather than simple fibroblastic tissue. Its origin is therefore not from the dural endothelium, as used to be thought, but from the arachnoidal ' exothelium.' Del Rio Hortega emphasizes this by using the name ' exothelioma,' which has the additional advantage of avoiding all confusion with the endotheliomas which arise from the walls of bloodvessels and lymphatic channels.

A greater divergence of opinion is evident in the naming of the tumours of nerves and nerve-roots. There is a tendency among many writers to restrict the use of von Recklinghausen's name ' neurofibroma ' to cases of multiple tumour, and to distinguish between these and the isolated tumours by using for the latter such designations as ' neurinoma,' ' perineurial fibroblastoma,' or ' schwannoma.' The term ' neurinoma ' was proposed by Verocay as a means of escape from the question whether tumours of nerves arose from the cells of Schwann or from the endo- or perineurial connective tissue. But it appears to be forgotten that this name was proposed for the multiple tumours of von Recklinghausen's disease and not for isolated tumours. Apart from this connotation, the name has no advantage, except brevity, over that proposed by von Recklinghausen, as it merely uses the Greek term ' inoma,' which Paget had suggested as an alternative to ' fibroma.' Verocay himself called them tumours of ' Nervenfaserzellen,' of which either name is an equally good translation.

The other terms proposed are definitely linked to a theory of origin of these tumours, a fact which tends to confusion among those to whom the exact position of the controversy is unfamiliar. For it is difficult at first sight to realize that the terms ' schwannoma ' and ' perineurial fibroblastoma ' refer to exactly the same kind of tumour. There appears therefore to be little justification for departing from the old-established name ' neurofibroma,' unless we hold that isolated tumours are essentially different from those of von Recklinghausen's disease. For this view there is scanty justification. Undoubtedly there is great variation in the type of tumours found in neurofibromatosis, some resembling plexiform neuromas full of myelinated fibres, and others isolated fibromas in which it is difficult or impossible to demonstrate nerve-fibres. In some cases one or other type predominates or occurs alone, but

intermediate forms of tumour or tumours of both types are often present. Nor does there appear to be any histological difference between the tumours on the roots of the cranial or spinal nerves in cases with multiple tumours and those which occur in the same situation as isolated tumours. To call such a tumour a ' neurofibroma ' if it is multiple, and a ' neurinoma ' or ' perineurial fibroblastoma ' if it is single, appears illogical, and is certainly confusing.

To the name ' craniopharyngioma ' there have been strong and well-grounded objections, and it is surprising that it still has a certain vogue. Frazier and Alpers have recently attacked this term, and have suggested that the suprapituitary epitheliomas should be called ' tumours of the hypophyseal stalk,' and should be clearly distinguished from the simple cysts in this region, for which they suggest the term ' tumour of Rathke's cleft.' Whether it is always possible to make so sharp a distinction seems doubtful, as a small area of epitheliomatous tissue is often present in what are otherwise simple cysts, but the general principle of the suggested nomenclature is sound. Although the name ' tumour of the hypophyseal stalk ' carries no suggestion as to the histological structure of the tumour, i.e. whether epitheliomatous or gliomatous, in view of the fact that many such tumours contain both types of tissue this may not be a disadvantage.

These questions of nomenclature have more than an academic interest, since clarity of thought is bound up with language. It is probable that the classification of the future will lay greater emphasis on the malignancy and rate of growth of the tumours, and that it will indicate more clearly which tumours arise from congenital ' cell-rests ' and which from normal adult cells. The occurrence of malignant types of such tumours as neurofibromas and exotheliomas, although rare, is well known, and it seems probable that almost any tissue within the cranium may give rise to tumours of varying degrees of malignancy. The proportion of intracranial tumours arising from congenital cell-rests, although perhaps larger than in any other system in the body except the genitourinary, is probably small, and in adult cases may be insignificant.

Abstracts
Neurology

NEUROANATOMY AND NEUROPHYSIOLOGY

[94] **A study of developmental craniocerebral topography as determined by the orthoscopic method.**—W. T. PEYTON. *Jour. Nerv. Ment. Dis.*, 1933, **78**, 232.

A SURVEY is given of the methods used and results obtained in the study of this subject.

The material for the present study consisted of a seven-month fœtus, three premature infants, two full-time infants, two children and two adult males.

A silhouette area was obtained and it was found that the area of the cerebrum expands very rapidly during the last months of fœtal life and the first eight months of post-natal life, and there is very little change in this area after the fifth year.

The superior Rolandic-coronal distance was found to increase with age, but these distances, and their increase with age, were not found to be as great as described by other investigators. The inferior Rolandic-coronal distance was found to increase more than the superior, and the distance found at various ages is approximately the same as those given by other investigators. The inferior end of the central sulcus was found to approach the squamous suture between birth and maturity. The lateral fissure was found also to approach the squamous suture between birth and maturity. These distances were found to be approximately the same as those given by other observers for the various ages. The changed relations of these two structures were demonstrated to be due, not to a rise of the suture or a descent of the fissure, but rather to a rise of both, the change in position of the former being greater than that of the latter.

The silhouette area of the lateral ventricle was found to increase but very little during the period of growth studied. Its posterior and lateral horns appear to extend farther posterior during the growth period studied, but the anterior horn appears to remain approximately stationary in the horizontal plane during the same period.

R. G. G.

[95] **Conditions of the transmission of nervous impulse over the sympathetic interneuronic synapses** (Condizioni della trasmissione dell' influsso nervoso attraverso le sinapsi simpatiche interneuroniche).—D. Bolsi and F. Visintini. *Riv. di pat. nerv. e ment.*, 1934, **43**, 1129.

The present research shows that in experiments on the sympathetic pupil dilator-fibres transmission is conditioned by the chronaxy of the single neurones. Drugs effect the transmission by altering the relationship of the chronaxies of single neurones. Even nicotine which was supposed to have a selective action on vegetative synapses is proved to act by altering the chronaxial relationships of the neurones concerned. In fact it lowers the chronaxy of the preganglionic fibres. Further researches on the action of drugs along these lines would be interesting.

R. G. G.

[96] **Histological aspects of the pineal body in relation to pregnancy** (Aspetti istologici della pineale in rapporto allo stato gravidico).—V. Desogus. *Riv. di pat. nerv. e ment.*, 1935, **45**, 555.

The author, after reviewing the researches which have led to the concept that the pineal gland does not exhaust its physiological possibilities after the attainment of sexual maturity, describes his own researches on birds and mammals, by means of which he has demonstrated the great activity of the pineal gland during the maximal activity of the genital organs and vice versâ. After having put forward radiological and clinical evidence leading to a similar point of view, and discussed the present state of the controversial question of the behaviour of the pineal gland during pregnancy, he opposes this last argument, showing on the basis of his own researches that the gland, after being progressively involved in the progress of the developing pregnancy, shows, as a very late stage, histological characters denoting a state of marked involution.

These facts lead to the concept of a pineal-genital endocrine system which antagonises the thyroid-suprarenal-pituitary group.

R. G. G.

[97] **Simple method of staining macroscopic brain sections.**—H. E. Le Masurier. *Arch. of Neurol. and Psychiat.*, 1935, **34**, 1065.

The author has devised a method of obtaining preparations of the brain in which the contrast between the white and the grey matter is sharp, with the colouring brilliant and the effect lasting. The technique is as follows.

Cut a brain, which has been thoroughly fixed in a dilute solution of formaldehyde U.S.P. (1 : 10), into slices of the thickness desired with a knife of the type used for work on the brain, which has been smeared with glycerine. The cutting should be done with one draw to avoid leaving marks of the knife.

Wash the specimen for from 12 to 24 hours in running water and place in distilled water for one hour, changing the water three times during the hour.

Then submerge the sections for two minutes, at from 60° to 65° C., in Mulligan's solution of phenol, covering with at least 2½ inches of solution. The formula for Mulligan's solution is as follows : 4 per cent. phenol crystals, 0·5 per cent. copper sulphate crystals, and 0·125 per cent. concentrated hydrochloric acid dissolved in distilled water.

Place the sections in a large volume of cold tap water for one minute and then in a 1 per cent. solution of ferric chloride in distilled water for two minutes and wash them in running water for five minutes. Place them in a 1 per cent. solution of potassium ferrocyanide in distilled water until the grey matter is a brilliant blue (this should not take longer than three minutes) and wash them in running water for 24 hours. Finally, preserve them in 70 per cent. alcohol.

R. M. S.

NEUROPATHOLOGY

[98] **Chemical studies in the epileptic syndrome.**—Helen Hopkins. *Amer. Jour. Psychiat.*, 1935, **92**, 75.

The results of this investigation dealing with the rhythmic diurnal and nocturnal changes in blood chemistry and water balance indicate that the quality of these changes may be correlated with the clinical observation of increased susceptibility to seizures during sleep, particularly after midnight. There is evidence of a shift of the blood and urinary titre toward the alkaline side during the early morning hours, as well as rising intracranial pressure and brain volume during sleep. In addition, the cholesterol content of the blood has been shown to fall consistently during sleep, reaching minimal values at 3 a.m. Each of these changes has been considered by others to be definitely related to the precipitation of seizures in susceptible individuals. The acid-base, water-shifting, and ionic blood changes in these experiments are qualitatively of the type to encourage the development of seizures during the latter half of the period of sleep. The rhythmic changes are observed to occur in the normal as well as in the epileptic subjects, and may be interpreted as the normal rhythm for blood chemistry.

C. S. R.

[99] **Permeability of the meninges in progressive paralysis to different hæmolytic amboceptors normal and complementary to blood serum** (Permeabilita delle meningi nella paralisi progressiva a vari ambocettori emolitici normali ed al complemento del siero di sangue).—M. Piolti. *Riv. di pat. nerv. e ment.*, 1935, **44**, 296.

The following results of experiments seem to emerge. The concentrations in human blood of hæmolytic amboceptors against sheep, horses, guineapigs,

rabbits and pigs vary in their proportions and quantity considerably from individual to individual. In progressive paralysis the passage of anti-sheep amboceptors from blood to cerebrospinal fluid constantly happens in the proportions—maximum 1–15, and minimum 1–125. The other amboceptors pass through in varying proportions, but the phenomenon is not constant and is regulated by the selective power of meningeal function. Also a concentration of the respective amboceptors in the blood has some importance, but much less than the meningeal selectivity in determining their passage from blood to cerebrospinal fluid. There is no record of the passage of horse, gûineapig, rabbit or pig amboceptors in any other affection of the nervous system. It has not been discovered if this is pathognomonic as is the sheep amboceptor in parenchymatous syphilis of the nervous system even in respect of cerebro-meningeal syphilis.

The results confirm the observation that in progressive paralysis a certain amount of complement is always present in the cerebrospinal fluid. It would seem that complement filtered through the meningeal barrier probably undergoes a chemical transformation which changes its value in respect of various hæmolytic sera. This phenomenon also can perhaps be explained by the theory of the selectivity of meningeal function on the ground that this does not permit the filtration in equal measure of single components of the complement. Further experiments showed that the introduction of a hypertonic sodium chloride solution in the blood does not increase the meningeal permeability in normal individuals, but mildly hypertonic solutions introduced into the arachnoid cavity produce gross alterations of this permeability. This might be of therapeutic value. In schizophrenia, meningeal permeability is generally lessened, but seems to correspond with a clinical form of the affection. Further investigation of this might prove of importance in prognosis and pathogenesis.

R. G. G.

[100] **Possible relation of lead intoxication to multiple sclerosis.**—B. Boshes. *Arch. of Neurol. and Psychiat.*, 1935, **34**, 994.

Specimens of cerebrospinal fluid from 28 patients were analyzed for lead by the Fairhall hexanitrite method.

In one of 16 cases of multiple sclerosis the fluid showed a positive result. The patient had been given sodium iodide, and the urine also showed lead. Of 12 other cases of various conditions, in only one, a case of lead intoxication, were abundant crystals found in the cerebrospinal fluid. In this case there was 0·2 mg. of lead per litre of urine.

Taking all three studies into consideration, there is no adequate proof for, and ample evidence against, the theory that lead is an ætiological agent in cases of multiple sclerosis.

R. M. S.

[101] **A histological study of a case of polymorph glioma associated with tuberous sclerosis** (Studio istopatologico di un caso di glioma polimorfo associato a sclerosi tuberosa).—F. VISINTINI. *Riv. di pat. nerv. e ment.*, 1935, **44**, 282.

THE histological examination of this case afforded a clear confirmation of the genesis of these conditions from embryological faults. The glioma had originated in a plaque of tuberous sclerosis in which neuroglial alteration was predominant and primary participation of ganglion-cells in the process is perhaps doubtful. The case seems to corroborate the theory of spongioblastosis. However in typical cases there are malformations of ganglion-cells which cannot be altogether attributed to secondary alteration. Also in the present case in which the principal malformation was neuroglial unusual forms of nerve-cells were found.

R. G. G.

[102] **Cerebral complications of putrid pleuro-pulmonary suppuration.**—IRA COHEN. *Arch. of Neurol. and Psychiat.*, 1934, **32**, 174.

THE author reviews 19 cases which presented cerebral symptoms complicating pleuropulmonary suppuration. These are arbitrarily divided into three groups : (1) abscess of the brain ; (2) aseptic embolus ; and (3) psychosis. It is suggested that a single ætiological factor is present in all groups, namely, an embolus. In the first group the embolus is infected, and in the second group aseptic ; in the third group it is postulated as a factor in the psychosis.

R. M. S.

[103] **The function of the diencephalon and the development of acromegaly** (Funzione del diencefalo e sviluppo dell'acromegalia).—N. SACCHETTI. *Riv. di pat. nerv. e ment.*, 1935, **44**, 433.

THE author has found the syndrome of acromegaly often associated with a tumour in the diencephalon and considers that acromegaly cannot be explained entirely on the basis of a tumour of the hypophysis. He thinks that two factors enter into the production of the syndrome, one hypophyseal and the other diencephalic.

R. G. G.

[104] **Lesions resulting from disturbances of tone and motility in cases of encephalitis lethargica previously treated by atropine** (Anatomisch nachgewiesene Folgen von Tonusstörungen und Motilitätsstörungen des Verdauungskanals bei Encephalitikern, die mit Atropin behandelt wurden).—H. SIEGMUND. *Münch. med. Woch.*, 1935, **82**, 453.

ENORMOUS enlargement of the bowel was detected at autopsy in four cases of encephalitis lethargica which had been treated by atropine. A similar

enlargement was observed clinically in seven patients suffering from chronic encephalitis treated by atropine for a prolonged period. A disturbance in tone of the musculature of the bowel appeared to be the cause of the enlargement.

M.

[105] **The pituitary body and the storage of glycogen** (Glykogenspeicherkrankheit und Hypophyse).—K. H. Hildebrand. *Münch. med. Woch.*, 1935, **82,** 694.

Thompson and Cushing repeatedly injected in dogs the gonadotropic hormone of the pituitary body. Among other results glycogen was stored up in the liver and in the muscles. Starting from these observations several human cases of socalled 'glycogen-storage disease' were examined for signs of endocrine disorder, especially of the pituitary body. The clinical picture in these cases proved very similar to the symptoms observed in animals by Thompson and Cushing. In consequence of these observations the condition characterized by a storage of glycogen (hepatomegalia glycogenetica) is assumed to be the result of disordered internal secretion, especially of the pituitary body. It was not possible to decide if disordered carbohydrate metabolism in cases of diminished pituitary function is always accompanied by defective absorption of glycogen.

M.

[106] **A study of syringomyelia and the formation of cavities in the spinal cord.**—E. S. Tauber and O. R. Langworthy. *Jour. Nerv. Ment. Dis.*, 1935, **81,** 245.

The syndrome usually associated with syringomyelia may result not only from cavity-formation but also from other lesions such as luetic meningomyelitis and thrombosis of the anterior spinal artery. There is little evidence that syringomyelia cavities are due to necrosis in a glial tumour, the cavity being surrounded by a glial scar rather than by tumour cells. In most cases cavities in the spinal cord are dependent on abnormalities of circulation. War cases show that cavities may be produced by concussion with no direct injury of the cord by the missile. The authors were able to produce cavities similar to those found in syringomyelia by interfering with the arterial supply.

R. G. G.

SENSORIMOTOR NEUROLOGY

[107] **Hemiplegia with the leg in flexion.**—Orthello R. Langworthy, Elmer Highberger, and Ruth Foster. *Arch. of Neurol. and Psychiat.*, 1935, **34,** 520.

Patients with injury of the pyramidal tract producing hemiplegia show abnormalities of tone that usually conform to a stereotyped pattern: the

arm is held in a flexed position and the leg in extension. Cases are reported here in which the leg was externally rotated and flexed at the hip and knee so that standing and walking were impossible. The position of the arm was variable ; it was often extended at the elbow. The patients were emotionally unstable and hyperæsthesia of the affected side could be demonstrated. Some complained of severe pain in the affected arm and leg. After lesions of the central nervous system any contracture that is present must be secondary, in the position imposed by the abnormality of tone. The flexor position of the leg in two cases was observed within a few days after the vascular accident. In these patients it is believed that the neural lesion was confined to the forebrain. The lesions were extensive and in several cases produced aphasia and injury of the lateral nucleus of the thalamus.

Two theories have been advanced in an attempt to explain these findings. The first of these postulates involvement of the lateral nucleus of the thalamus, while the other theory suggests a combined lesion of the pyramidal tract and afferent pathways from the corpus striatum.

R. M. S.

[108] **A case of congenital multiple arteriovenous aneurysm intra- and extra-cerebral, with psychological correlations.**—G. Van Ness Dearborn. *Jour. Nerv. Ment. Dis.*, 1935, **81**, 411.

A case is described of congenital telangiectatic aneurysm of the occipital and left parietofrontal regions, perhaps bilateral, of unknown extent and location inside the brain. The patient showed a low degree of intelligence and a probable deterioration in the functions which he had acquired, since his memory gradually seemed to have failed and at the age of 43 was becoming worse. He suffered from unvarying but periodic attacks of pain-pressure feelings, followed by aphasia, babbling, mumbling and somnolence without falling. This would seem to be a fairly typical example of the relatively rare condition of ' nævoid amentia.'

R. G. G.

[109] **Subarachnoid hæmorrhage from an aneurysm of the basilar artery. A crossed syndrome of the cerebral peduncles associated with choreo-athetoid movement** (Emorragia subaracnoidea da aneurisma dell' arteria basilare : Sindrome peduncolare alterna con movimenti coreo-atetosici).—P. E. Maspes. *Riv. di pat. nerv. e ment.*, 1934, **43**, 1051.

A fatal case occurring in a young man of 26 with Weber's crossed peduncular syndrome, hypotonia and choreoathetoid movement of the non-paralyzed arm is described.

Autopsy revealed that the aneurysm was syphilitic in origin and that there existed an infiltrative syphilitic inflammation of the small mesencephalic vessels. The crossed hemiplegia was produced by a thrombotic infarct at the base of the right cerebral peduncle and compression of the third nerve by the aneurysm. The hyperkinesis may be explained by an infarct implicating the right superior cerebral peduncle before it crossed and the hypotonia from a coincident lesion of the reticular substance of the tegmentum of the midbrain. While some of the symptoms may be attributed to the presence of the aneurysm, considerable importance must be attached to the thrombosis following the first hæmorrhage of the aneurysm, although it was able to extend to the interparenchymatous vessels derived from the aneurysmal basal vessels producing infarcts in the nervous tissue.

R. G. G.

[110] **Relationship of migraine, epilepsy and some other neuropsychiatric disorders.**—H. A. Paskind. *Arch. of Neurol. and Psychiat.*, 1934, **32,** 45.

The prevalence of familial, parental and personal migraine among patients with epilepsy has been compared with the incidence among patients without neuropsychiatric disorders and among patients with manic-depressive psychosis, trigeminal neuralgia, psychasthenia, dementia præcox, tic, constitutional inferiority and paranoid states. These comparisons indicate that there is no special relationship between migraine and epilepsy and that the migraine occurs as evidence of a familial neuropathic trend in the other neurological conditions studied.

R. M. S.

[111] **Epilepsy in identical twins : a presentation of three pairs of twins.**—R. H. Guthrie and W. M. Lebowitz. *Jour. Nerv. Ment. Dis.*, 1935, **81,** 388.

Three sets of identical twins are presented who suffered from epilepsy and mental deficiency and, in two cases, hemiplegia. It is practically certain that these conditions were due to congenital defects and not to birth trauma. Such neurological syndromes may be attributed with too great facility to injuries at or after birth whose existence cannot be proved by careful anamnesis.

R. G. G.

[112] **The Parkinsonian syndrome due to trauma.**—W. L. Bruetsch and Murray Dearmond. *Jour. Nerv. Ment. Dis.*, 1935, **81,** 531.

A case of Parkinsonism is described which seems to have been directly due to brain injury. A fracture of the base was discovered and no other lesions

except in the basal ganglia and midbrain, which seemed to show softening as the result of petechial and perivascular hæmorrhages.

R. G. G.

[113] **The neurological aspects of uveo-parotid fever.**—P. M. Levin. *Jour. Nerv. Ment. Dis.*, 1935, **81**, 176.

A typical case of Heerfordt's uveo-paratid fever is described. The symptoms consisted of bilateral iridocyclitis, enlargement of both parotid and the left submaxillary glands, transient left facial palsy, bilateral nerve deafness, numbness of the face and polydipsia with polyuria. The latter symptom is considered to be a true diabetes insipidus and responded to treatment with pituitrin. The syndrome seems to be of tubercular origin and lesions occur in the brainstem as well as in the cerebrospinal nerves. The course is slow but recovery with slight ocular defects practically always results.

R. G. G.

[114] **Concerning intraspinal dermoids and epidermoids with report of a case.**—S. W. Gross. *Jour. Nerv. Ment. Dis.*, 1935, **80**, 274.

A description of an epidermoid tumour of the spinal cord with a review of the literature. These tumours seem to be closely related to dermoids and to be a further example of inclusions of embryonal epidermal tissue.

R. G. G.

[115] **A case of coincident epidemic encephalitis and disseminated sclerosis** (Gleichzeitiges Vorkommen von Encephalitis epidemica und multiplen Sklerose).—G. Peters. *Deut. Zeits. f. Nervenheilk.*, 1935, **138**, 23.

By histological examination changes characteristic of epidemic encephalitis in addition to those of disseminated sclerosis were detected in the central nervous system of a patient who had shown clinical signs typical of both disorders. Similar cases have been described previously. Consequently the coexistence of the two diseases must be allowed.

M.

[116] **A case of so-called cramp disease** (Ein Fall von Crampuskrankheit).—J. Wilder. *Zeits. f. d. g. Neurol. u. Psychiat.*, 1935, **153**, 193.

A case of so-called cramp disease (Wernicke) observed over a period of six years presented several interesting features. Blood uric acid was increased

evidently as a result of disturbed renal secretion ; also diabetes mellitus was present together with a moderate degree of spondylarthritis deformans and a slight degree of neuritis or radiculitis. The cramps ceased when the radiculitis became worse ; they returned when the symptoms of radiculitis improved. An increase in the blood uric acid and a slight degree of radiculitis evidently were of great importance in producing painful spasms. On the other hand, metabolic changes resulting from diabetes were of no importance in the production of cramp. The spasms were diminished by a meatless diet and by decreasing the amount of uric acid in the body. The patient usually felt better in the spring and still more so in the summer than during the winter.

By electrical examination the so-called myospastic reaction was demonstrated. The signs of the reaction were as follows : With a prolonged faradic current cramp in the abdominal muscles arose ; this never resulted from a galvanic current. In the lower limbs irritability to galvanism was diminished for direct as well as indirect excitation but to faradism the excitability was normal in the lower limbs for direct as well as indirect excitation. The quality of the contraction was everywhere normal.

M.

PROGNOSIS AND TREATMENT

[117] **Treatment of epilepsy with antirabic vaccine** (Behandlung der Epilepsie mit antirabischen Vakzinen).—M. NIKOLIC. *Münch. med. Woch.*, 1935, **82**, 1493.

A MAN, age 48, had suffered from typical idiopathic epilepsy for 38 years. For the last two years one or two epileptic fits had occurred daily. He was bitten by a dog suspected of suffering from rabies. The patient received an injection of antirabic Markvaccine Type B (Hempt) for two days and of Hirnvaccine Type A on each of the following six days. He had no fits and was well and healthy when seen three months after the first injection. It would be of interest to know if other cases of genuine epilepsy can be relieved in the same manner.

M.

[118] **Trends in the outcome of general paresis.**—HORATIO M. POLLOCK. *Psychiatric Quarterly*, 1935, **9**, 194.

THIS study comprises 10,240 first admissions, of which 8,186 were males and 2,054 females. It was found that the trend in rate of first admissions with general paresis is slowly declining, but the trend in female first admissions is rising. No change is found in trend in age-distribution of first admissions. Trends in recovery and improvement are upward and in death rates down-

wards. Noteworthy gains are found in results in treatment in all age-groups of both sexes during the period 1926–1931 as compared with the period 1920–1925.

C. S. R.

Psychopathology

PSYCHOLOGY

[119] **Incidental memory for pleasant, unpleasant, and indifferent words.** —Arthur Silvermann and Hulsey Cason. *Amer. Jour. Psychol.*, 1934, **46**, 315.

Seventy-three students graded their feelings towards 117 words as pleasant, indifferent, or unpleasant principally on the basis of their personal association with the words. A few minutes later they were unexpectedly asked to recall as many of these words as possible. It was found that a larger number of the words in the original list were graded pleasant than were graded indifferent, and a larger number were graded indifferent than were graded unpleasant. Less time was taken in deciding upon the grades of pleasantness or unpleasantness than upon the grades of indifference. When the grades were examined a second time and any needed changes made, the majority of the changes that were made were from indifferent to pleasant and from indifferent to unpleasant. Finally, it was found that the relative order of efficiency for the three grades was pleasant—unpleasant—indifferent for recall, for recognition, and also for words not recalled but later recognized.

C. S. R.

[120] **The psychology of rumour : A study relating to the great Indian earthquake of 1934.**—J. Prasad. *Brit. Jour. Psychol.*, 1935, **26**, 1.

Rumour is a group-response to situations affecting the whole group. As regards the nature of the situation, it is highly emotional, of an unusual type of interest to the whole group, and it contains many unknown and unverifiable aspects. As regards the nature of the responses, the different classes of rumours—namely, exaggerations, fabrications, explanations and astrological predictions—are group-responses to different aspects of the total complex situation, or solutions of different problems presented by the total situation. These responses or solutions are dominated by emotional and imaginative factors. The main determinants of rumour are : (1) the emotional nature of the situation and the various aspects and problems it contains, provoking different tendencies ; (2) the group mentality of individuals and the social tendencies of comradeship and suggestion.

C. S. R.

[121] **A note on the persistence of moods.**—E. N. KENDREW. *Brit. Jour. Psychol.*, 1935, **26**, 165.

THE experiment here dealt with was devised to test the possibility of achieving a technique for measuring the degree of persistence of moods experimentally aroused in young children. The 20 cases fell into three groups. In nine disappointment appeared to produce persistent effects of a diminishing order of magnitude; in eight cases the persistent effect was of an increasing order of magnitude; in three cases no noticeable effects could be observed. In several cases a persisting conative activity showed itself in general behaviour, but the emotional disturbance had a greater effect on the natural rate of working. The experimental results are shown to fit well with general observations. Interest and fatigue influenced the results in a few cases, while two children, at least, delayed the effect of disturbance by a determined effort.

C. S. R.

[122] **Involuntary self-expression in gait and other movements; an experimental study.**—WERNER WOLFF. *Character and Personality*, 1935, **3**, 327.

ONLY in a minority of cases is it possible to identify a person from gait. Recognition of sex is not always reliable; in particular, correct and incorrect judgments concerning men are about equally balanced; women, however, are mostly recognized as women. Self-identification as well as identification of others from gait differs from identification based on other forms of expression; one's own gait is easily recognized but another person's gait seems to present considerable difficulty. Generally the judges interpret gait as well as other forms of expression psychologically, describing mainly emotional personality traits. Gait is in itself a complete form of expression and seems to characterize a person independently of all other forms. The comparison of the judgments from gait with those from other forms of expression shows considerable agreement. Judgments of others from gait show poor identification but good characterization, while in self-judgment we find very good identification. Subjects seem to be reluctant to judge their own gait objectively, even if they do not recognize themselves.

C. S. R.

NEUROSES AND PSYCHONEUROSES

[123] **Spasm of the retinal artery in functional blindness caused by suggestion** (Spasmo delle arterie retiniche in amaurosi funzionale provocata colla suggestione).—G. ROSSENDA. *Riv. di pat. nerv. e ment.*, 1935, **45**, 59.

IN a hysterical patient studied by Rossenda it was possible to observe a

spasm of the retinal artery during blindness caused by suggestion. Such observations, with the arguments advanced, contribute to the pathogenic interpretation of these hysterical phenomena.

R. G. G.

PSYCHOSES

[124] **Psychoses with pernicious anæmia.**—Karl M. Bowman. *Amer. Jour. Psychiat.*, 1935, **92**, 371.

At the Boston Psychopathic Hospital for the past 14 years, out of 26,000 admissions, only 22 were found to have pernicious anæmia. The histories of six cases are given and the points of interest in all of the cases discussed. Two of them illustrate how an early case may be regarded as a psychoneurosis and various psychological factors held responsible for the condition, whereas an examination of the blood would have revealed the correct diagnosis much earlier. Many cases are probably overlooked in the incipient stage and emphasis should be laid upon such symptoms as numbness of the hands and feet, tingling or paræsthesiæ of various sorts together with feelings of weakness and gastrointestinal symptoms. Fifteen of the patients were males, eight were females. The average age was 50 years. It is likely that pernicious anæmia exists at least one to two years before it is actually diagnosed. Occasionally the mental symptoms were discovered and treated before it was realised the patient had pernicious anæmia. The apparent range of time between the onset of the anæmia and the onset of mental symptoms varied from one day in two cases, less than a week in four more cases, up to a year or longer in six cases. The question as to how much the psychosis is due to pernicious anæmia, how much to constitutional factors, may be partially decided by a study of the family history and the prepsychotic personality. The family history was negative for mental disease in 16 cases, positive in five, and unknown in two. Sixteen patients were listed as having a normal personality, five as having an unstable one, and two as unknown. There is thus little evidence of a constitutional or hereditary factor as playing an important part in the production of the mental disorder. Concerning the type of mental picture shown in these 23 cases, there were very few clear-cut reaction types. Eleven showed the picture of an organic confusion; three depression; two manic excitement; four a schizophrenic type of reaction; two showed the mixed picture of a schizoaffective reaction; and one was called a psychoneurosis. It is of interest to note that mental disease may come on while the patient is getting liver treatment and has a normal blood count, and that improvement of the mental condition does not necessarily correlate with improvement of the anæmia.

C. S. R.

[125] **A confusional state associated with infective endocarditis.**—David Shaw. *Jour. of Ment. Sci.*, 1935, **81**, 435.

This case is interesting as showing the development of a confusional state associated with infective endocarditis. In the light of the post-mortem findings, the extensive area of ulcerative endocarditis, the damage to the brain and widespread area of infarction, it appears highly probable that the patient's dulled mental state, her emotional instability and incontinence, were due to repeated small embolic hæmorrhages in the frontal lobes and hemispheres generally, and possibly in the thalamus. It suggests, too, that the confusional states which sometimes occur in advanced cases of endocarditis (apart from septic endocarditis) might be explained on this physical basis of repeated embolic hæmorrhages in the brain, not large enough or situated in the necessary position to cause the usual marked physical lesions of hemiplegia, etc., but sufficiently destructive to damage the associational paths subserving the higher centres of cerebration.

C. S. R.

[126] **Serum calcium and sodium in some psychotic disorders.**—A. H. Tingey and S. W. Hardwick. *Jour. of Ment. Sci.*, 1935, **81**, 528.

Normal serum Ca has been found in manic-depressive psychosis, involutional melancholia, dementia præcox, paraphrenia, mental deficiency, and in various unclassified mental disorders. In epileptics (*a*) serum Ca and Na have been found within the range obtained for normal controls, but with a tendency to lower values. (*b*) In individual cases, a greater fluctuation of serum Ca within the normal limits has been observed than in normals or in cases of dementia præcox. (*c*) Ca was normal in four cases where blood was drawn during the fit, and in three of these, where blood was also drawn at varying times after the fit, no reduction of Ca below the normal limit was observed. (*d*) No evidence has been found of any disturbance of the ratio Ca/Na, expressed in milli-equivalents per 1,000 ml., greater than that observed in normal controls, either during interval periods, or at about the time of the fit. (*e*) Protein has been found normal in two cases where blood was drawn during and at varying times after the fit.

C. S. R.

[127] **Familial organic psychosis** (Alzheimer's type).—K. Lowenberg and R. W. Waggoner. *Arch. of Neurol. and Psychiat.*, 1934, **31**, 737.

Alzheimer's disease was originally regarded as a clinical and pathological entity. Recent reports of the occurrence of the disease as early as the second and third decades of life, however, preclude the conception of this syndrome as a presenile phenomenon. A case of unusual interest is here reported, as

it concerns the appearance of the disease in several members of a family and in two generations.

The conclusion is that Alzheimer's disease may be subdivided into several clinical types : (*a*) the presenile type (hereditary transmission not known) ; (*b*) the intermediary type (with hereditary trends), and (*c*) the juvenile type (hereditary transmission not known). Histopathologically, all these types constitute a unit.

C. S. R.

[128] **The blood fats in schizophrenia.**—A. T. Brice. *Jour. Nerv. Ment. Dis.*, 1935, **81,** 613.

It would appear that the amount of cholesterol in the blood is greater than that injected. Excess is due to the fact that cholesterol is a terminal product of metabolism of nervous tissue and that there is a correlation between excess of cholesterol, unsaturated fatty acids in the blood, and muscular activity. These substances are definitely deficient in schizophrenics, more especially in the apathetic stuporous type of case. This is also associated with emotional activity.

R. G. G.

[129] **Investigation of polyuria in schizophrenia.**—Francis H. Sleeper. *Amer. Jour. Psychiat.*, 1935, **91,** 1019.

The average urinary output in a series of 92 male schizophrenics was 2,532 c.cm., that of 26 presumably healthy control subjects 1,328 c.cm. Restrictions of water intake to about 1,900 c.cm. of water both as such and in food in 10 of the patients with very high urinary output resulted in no particular complaints of thirst on their part although they did complain of the sameness and amount of food. It has been shown that the kidneys of schizophrenics are able to concentrate and dilute urine within normal limits in response to the ingestion of 1 litre of water. The antidiuretic effect of obstetrical pituitrin is as effective in schizophrenic patients as in normal subjects.

C. S. R.

[130] **Experimental studies on the connection of schizophrenia and tuberculosis.**—A. Beck, W. Ogden, and M. Whelen. *Jour. of Ment. Sci.*, 1935, **81,** 514.

The examination of the cerebrospinal fluid of schizophrenics for the presence of a tuberculin-like antigen was negative. The complement-fixation test with blood-serum was positive in 8·1 per cent. of schizophrenics and in 12·3

per cent. of other psychotics. Blood culture for tubercle bacilli using the methods of Loewenstein and of Ninni and Bretey was carried out with 31 schizophrenics. In all cases the result was negative. The efficacy of the method used was proved by the positive results obtained with it in 30·5 per cent. of cases of known tuberculous infection in animals. The inoculation of 29 blood, 27 cerebrospinal fluid and two brain samples from schizophrenics into guineapigs, which were subsequently treated with an acetone extract of tubercle bacilli, gave negative results. These results indicate that there is no ætiological connection between schizophrenia and tuberculosis.

C. S. R.

PSYCHOPATHOLOGY

[131] **Chronic post-encephalitis in juvenile delinquents.**—Matthew Molitch. *Amer. Jour. Psychiat.*, 1935, **91**, 843.

From the study of boys with chronic post-encephalitis who found their way into an institution for juvenile delinquents the following conclusions were reached. The early diagnosis may be made by the detection of changes in posture, tonus, associated movements (synkinesia), and ocular signs. The change in behaviour may occur at any time from a few days to a number of years after the acute attack. The traits exhibited by these children may include every conceivable act, occasional or habitual, and all of the different psychic and emotional states. Their behaviour appears to be impulsive in nature, and of such great intensity as often to overwhelm their resistance. The mentality of the patients is impaired and to a greater degree if the acute attack occurred during the first few years of life. Re-examination, psychologically, suggests that mentality deteriorates in a small proportion of cases. The school work is in keeping with the mental level. Forensic responsibility should be determined by individual study and not by study of the group. Treatment consists of individualization of the programme of training. Specific therapy is not discussed.

C. S. R.

[132] **The association of physique and mental condition.**—J. L. Clegg. *Jour. of Ment. Sci.*, 1935, **81**, 297.

From the examination of 100 schizophrenics, 100 manic-depressives, and 100 normal males, small but significant differences were found anthropometrically. The stature and cranial capacity were both less in the psychotic but there was no departure from the normal in the shape of the psychotic skull. The face was somewhat narrower in the psychotic and this narrowness was most marked in the lower part of it in the schizophrenic type. The manic-depressive had a shorter face and more shield-shaped in outline. The

nose tended to be longer in the psychotic and in the case of the schizophrenic the nose was also narrower, the upper lip shorter, and the ear both shorter and narrower. The proportion of the trunk to the leg was less among manic-depressives and the legs were proportionally longer also in this group. The length of the arm was less in the psychotic and this was most noticeable in the schizophrenics. Increased pelvic width was common among manic-depressives while in both the psychotic groups the shoulders were narrower and the neck shorter.

C. S. R.

[133] **The interrelationships of mental disorders and diabetes mellitus.**—WILLIAM C. MENNIGER. *Jour. of Ment. Sci.*, 1935, **81**, 332.

CERTAIN fluctuations of a specific type occur with sufficient frequency in diabetic individuals to suggest a descriptive picture of a 'diabetic personality.' Diabetes does not determine the type of frank mental disturbance that may be associated with it, except in a small percentage of cases that may be referred to as toxic psychoses or true 'diabetic psychoses.' Psychological conflicts may be an important ætiological factor in many cases of diabetes and possibly in some instances they may cause the disease, though this is not proved. Gross psychological trauma may initiate diabetes, but the more important unconscious conflicts might conceivably be the cause of the entire picture, even in these cases, and possibly operate in some instances to produce diabetes in the absence of any external event or situation. Mental disorder and diabetes never occur independently in the same patient. They may occur independently at different times, but once associated, they bear a relationship to each other.

C. S. R.

[134] **Encephalographic studies in mental disease. A study of 152 cases.**—MATTHEW T. MOORE, DAVID NATHAN, ANNIE R. ELLIOTT, and CHARLES LAUBACH. *Amer. Jour. Psychiat.*, 1935, **92**, 43.

ENCEPHALOGRAMS in the organic psychoses have indicated cerebral pathology by deviations from the normal cerebral architecture. In schizophrenia, manic-depressive psychosis, and epilepsy with psychosis, such deviations have also been shown. In the encephalograms of patients with dementia paralytica and schizophrenia there is a tendency to an individual pattern complex which characterizes the condition. Not infrequently, a mental deterioration is found to be more marked in those patients in whom the encephalograms reveal a selective parietal lobe atrophy. In the various groups of psychoses they have all been abnormal.

C. S. R.

[135] **On certain delirious attacks of systematized denial** (Su alcuni deliri di negazione sistematizzati).—J. NARDI. *Riv. di pat. nerv. e ment.*, 1935, **45**, 664.

SIX cases are described in patients who were either subject to previous deliria or in whom the attacks were isolated phenomena. The theme of the delirium was a denial of death or matrimony or paternity either at the time or retrospectively. Denial of death was a reactive psychosis against a painful incident which by a special affective mechanism was repudiated.

Denial of matrimony or paternity was a phantasy of jealousy which systematized itself by a process of criticism and interpretation. This resulted in a falsification of the facts with a final repudiation of them and a gradual lowering of mental level of the whole process. Thus by the time the delirium was established all higher intellectual processes were in abeyance and a purely automatic reaction was all that was left.

R. G. G.

[136] **Auditory hallucinations in problem children.**—A. T. CHILDERS. *The Ohio State Medical Journal*, 1934, **30**, 299.

IN a study of 148 problem children, the occurrence of definite hallucinations was determined in 25, or 16·9 per cent. All were children having intelligence quotients of 70 or above, and ranged between the ages of 10 and 18 years. The child who is seriously isolated from association with his playmates is the type in whom hallucinations are most frequently present. In the more outgoing type of problem children they are comparatively infrequent, and quite rare among well-adjusted children. The auditory hallucinations have most frequently been characterized by (1) accusations of incest; (2) sex perversions; (3) threatenings; (4) praise unmerited; and (5) promises impossible of realization. The close relationship between hallucinations, dreams and day-dreams is pointed out and reference is made to the importance of a careful technique in eliciting hallucinations from children. If carefully handled the bringing of them out can be utilized in helping the child to solve his conflicts, thereby contributing to his better social adjustment.

C. S. R.

[137] **The mental regulation of intestinal activity.**—J. M. EDWARDS. *Jour. of Meni. Sci.*, 1935, **81**, 376.

THE physiological and emotional aspects of intestinal activity are discussed and it is noted that in the attempt to correlate mental conditions and bowel action with any degree of accuracy it is the assessment of the mental side that is difficult. Apart from the field of common experience, the most likely group

for investigation is that of the psychotics, their mental tone being comparatively well manifest. There are two main mental states apparent as having physical side affects—apart from the emotions. There are those who, as far as possible, fail to react to stimuli, and those who react to stimuli in an exaggerated and disorganized manner. These correspond roughly to the introvert and extravert types respectively, and it is interesting to note that the first shows both a decreased, slow reaction to secretion of adrenaline and a decreased general reaction to adrenaline, whereas the second type shows just the opposite in both cases. In each of the author's series of patients, a recognizable correlation was present between the state of mind and bowel function. No measurable index was found, but rough degrees were not hard to assess in the individual. A good account of the mental state should make possible an accurate general forecast of bowel function, and where these did not agree in the investigation, organic disease was found to be present. Constipation is always a symptom of either mental or organic aberration, and the attempt is made to show the high percentage of the former, and to draw attention to constipation as an immediate symptom of mental difficulty.

C. S. R.

[138] **Alcohol injected intravenously : Some psychological and psychopathological effects in man.**—HENRY W. NEWMAN. *Amer. Jour. Psychiat.*, 1935, **91**, 1343.

IN the majority of cases, the administration of ethyl alcohol as a 10 per cent. solution intravenously may be accomplished without the subject realizing that he is receiving alcohol. This is of paramount importance in any investigation of the effects in man. By the use of this method, it has been shown that the response to moderate doses of alcohol in normal individuals consists of an increased freedom of conversation, an intensification of the previously existing mood, and a tendency to drowsiness. The psychoneurotic group showed an exaggerated garrulity, a tendency to excessive emotional outbursts, and a multiplication of symptoms. Many showed improved rapport with the physician, and were rendered more accessible to psychotherapy, especially direct suggestion. The schizophrenics, on the contrary, retired farther from reality, becoming antagonistic, mute, and negativistic in varying degree.

C. S. R.

[139] **A psychiatric concept of acute alcoholic intoxication.**—ROBERT FLEMING. *Amer. Jour. Psychiat.*, 1935, **92**, 89.

THE varied symptomatology of acute alcoholic intoxication depends upon the interplay of two main factors : the pharmacological action of alcohol on the

several physiological systems, and the personality of the intoxicated individual with its constitutional and acquired components. The pharmacological action may be modified by the dose of the alcohol, the nature of the beverage and the physiological state of the organism, but is ultimately dependent upon the concentration of alcohol in the tissues. The study of the elements contributed by the personality to the clinical picture of drunkenness has been neglected but offers a promising field for investigation.

C. S. R.

[140] **The sedimentation test in psychotic patients with pulmonary tuberculosis.**—GEORGE C. BOWER and GABRIEL SCHEIN. *Psychiatric Quarterly*, 1935, **9**, 263.

IN the past 14 months 455 sedimentation tests were performed on a series of 60 patients who were sent to the tuberculosis pavilion for diagnosis or treatment. It was found that this test was a better index of tuberculous activity than temperature, pulse, or gain in weight. Together with X-ray the sedimentation rate furnishes the best means of following the progress of a tuberculous psychotic patient, especially of the deteriorated type.

C. S. R.

[141] **The blood-cerebrospinal fluid barrier in mental disorders.**—D. ROTHSCHILD and C. N. HAMBERG. *Amer. Jour. Psychiat.*, 1935, **91**, 1033.

THE distribution of calcium between blood and cerebrospinal fluid was investigated in 400 cases of mental disorder. Five hundred and twenty-three determinations of the ratio of blood to spinal fluid calcium were made. In addition, 480 determinations of the distribution ratio of bromide and 347 determinations of the protein content of the cerebrospinal fluid were performed on parts of the same specimens that were used for calcium determinations. In the schizophrenic group 29 per cent. of the calcium ratios were above 2·2 and 3 per cent. were below 1·8. In neurosyphilis 8 per cent. of the calcium ratios were above 2·2 and 12·5 per cent. were below 1·8. Low ratios occurred with greatest frequency in untreated patients with general paresis. The other groups showed a smaller proportion of abnormal results without any striking preponderance of increased or decreased values. The results were suggestive of a tendency towards decreased permeability of the blood-cerebrospinal fluid barrier in schizophrenia and increased permeability in untreated patients with general paresis. There was a general correlation between the distribution ratios of calcium and bromide in schizophrenia, affective psychoses and untreated neurosyphilis. In the individual cases this correlation was lacking.

C. S. R.

[142] **Mental symptoms in a case resembling amyotrophic lateral sclerosis** (Ueber einen der amyotrophischen Lateralsclerose nahestehenden Krankheitsprozes mit psychischen Symptomen).—E. TEICHMANN. *Zeits. f. d. g. Neurol. u. Psychiat.*, 1935, **154**, 82.

A MAN of 42 began to suffer from a general neurotic disturbance, and after seven months developed definite mental symptoms, viz. depression with suicidal tendency. Motor weakness on the left side of the body combined with a sensation of pins and needles was then detected and the plantar reflex was extensor on both sides.

Three months later the patient was much worse; all the small muscles were atrophied in both hands but sensation was normal for every test. The cerebrospinal fluid showed no abnormality. The patient was now completely insane and suffered from delusions. Some weeks later the ocular movements were impaired, the pupillary reaction to light and convergence practically absent, the seventh nerve was paretic on the left side, speech was very indistinct, and the knee jerk diminished on the left side. On electrical examination incomplete reaction of degeneration was found in the small muscles of the hands. The patient died a few months later.

The mental symptoms seemed to favour a diagnosis of disseminated sclerosis at the onset; later a diagnosis of amyotrophic lateral sclerosis had to be considered. The affection of the ocular muscles further complicated the diagnosis.

Diffuse affection of the cells in the brain was detected in this case on microscopical examination; the larger cells were more damaged than the smaller ones. In certain parts of the brain the involvement was more severe than in others. The nerve fibres in the brain were also affected, but systemic degeneration was not seen anywhere. Alterations in the neuroglia and the meninges were observed; probably the brain cortex was first affected. It has to be assumed that an inflammation of an unknown nature had spread by way of the blood stream. It would appear that these cases constitute a type of disease not previously regarded as a clinical entity.

M.

PROGNOSIS AND TREATMENT

[143] **Hæmatoporphyrin treatment in dementia præcox and involution melancholia.**—J. NOTKIN, VIOLA HUDDART, and BLANCHE DENNES. *Psychiatric Quarterly*, 1935, **9**, 368.

A SYNTHETIC preparation of hæmatoporphyrin was used intramuscularly and orally in 10 women patients with dementia præcox and 10 involution melancholia patients of the same sex. None of the dementia præcox group showed any signs of improvement. The catatonics became more negativistic and the paranoid patients more delusional, some of them having utilized the

treatment procedure in their delusional formations. One of the melancholia patients improved considerably. Three others showed a mild transitory improvement and the other six remained unchanged. Slight variations in weight were noted after treatment in both the præcox and involutional cases. There was a tendency to low basal metabolism value prior to treatment in the dementia præcox group. Insignificant changes were noted in the oxygen consumption rate during and at the end of treatment in both groups. There was a larger number of cases with relatively low blood counts prior to the institution of treatment in the melancholic group as compared to the dementia præcox group. Improvement in the blood picture at the end of treatment was noted in the involutional melancholia patients.

C. S. R.

[144] **Treatment of schizophrenia with prolonged narcosis.**—Paul Hock, *Psychiatric Quarterly*, 1935, **9**, 386.

On the basis of his experience the author outlines the following indications for prolonged narcosis in this psychosis. All acute schizophrenics with excitement, depression or apprehension, are suitable cases, the most favourable results being obtained in cases of acute catatonic excitement. Less favourable results are observed in stuporous cases and in mute, manneristic catatonias with stereotypies and other psychomotor phenomena. Quiet, self-absorbed catatonics are also suitable to lessen the autism and diminish the negativism. The procedure employed is preliminary to a psychotherapeutic approach. Chronic or slowly developing forms of catatonics are not much influenced by prolonged narcosis. No beneficial results were observed in cases of dementia simplex or in schizophrenics accompanied with mental deficiency unless episodes of excitement or depression were present. The treatment is used primarily to control the excitements : no effect upon the psychosis per se can be expected. Quiet, paranoid schizophrenics are not influenced. Cases where the psychosis was precipitated by an actual conflict in the environment respond most favourably to the treatment. Better results are obtained when certain psychotherapeutic measures are employed after completing the narcosis. Occupational therapy should be immediately used where it is practicable. In three different groups in the author's clinic, scopolamin-luminal, avertin-luminal, and pernocton-luminal were the narcotics respectively used.

C. S. R.

Reviews and Notices of Books

Psychology and Health. By H. Banister, M.Sc., Ph.D. London: Cambridge University Press. 1935. Pp. 256. Price 7s. 6d.

THE author, who is Director in Psychological Studies at Cambridge, here aims at helping medical students and practitioners to understand the workings of the human mind. With this end in view, chapters are devoted to mental defect, the problem child, infantile sexuality, troubles of the healthy, effects of ill-health, the invalid, and the unconscious and dissociation. Suggestion and hypnosis are also dealt with. Following brief consideration of the psychoneuroses and of the theories of Freud, Jung, and Adler, methods of treatment are discussed. In this necessarily superficial survey of such a wide subject, Dr. Banister has succeeded in giving his readers good insight into the workings of the mind, both in its healthy and warped aspects. With good reason the psychoses have been left out of account. One point would we question: though hypnotism has been and in selected cases could still be adopted for the elimination of pain in surgical cases and for the facilitation of childbirth, it is hardly true that it is in common use for such purposes as is here stated. Amid the many books dealing with similar themes, this one can be looked upon as a suitable guide.

Understanding Yourself. By Ernest R. Groves. London: George Allen and Unwin Ltd. 1935. Pp. 278. Price 7s. 6d.

THE author says the first step towards a happy and efficient life must always involve squarely facing one's own endowment, disposition, and cravings. To this end there must be a rational searching of the self. The motive of these pages is to help the reader 'to know himself, to tolerate what cannot be changed, and to utilize to the full his personal and unique resources.' In successive chapters various factors that enter into the development of a healthy personality, human 'drives,' possible errant tendencies, are severally dealt with. This endeavour to show how to play the game of life means covering a wide field. The writer is not only intimate with modern psychological knowledge but treats his subject so clearly that the lay reader will find his interest sustained on the many complex problems presented to him. In an appendix a bibliography is given for those who desire further study on these lines. The book can be cordially recommended.

The Single Woman and her Emotional Problems. By Dr. Laura Hutton. With a foreword by Dr. David Forsyth. London : Baillière, Tindall and Cox. 1935. Pp. 151. Price 5s.

THIS small volume has been written in an endeavour to help the large number of more or less independent single women who earn their own living and whose marriage is perhaps an unlikely contingency. Not only the not having any adequate natural fulfilment of their normal womanly physiological function but other factors as well may bring about psychological problems which are here discussed simply and understandingly. The writer deals well with her subject in its various aspects, but some of the psychoanalytic points regarding the sources of homosexuality will only tend to mystify the average reader. The same may be said about the brief references to alcoholism, drug-addiction, and paranoia. Apart from these small detractions, the contents should prove useful to those to whom it is addressed.